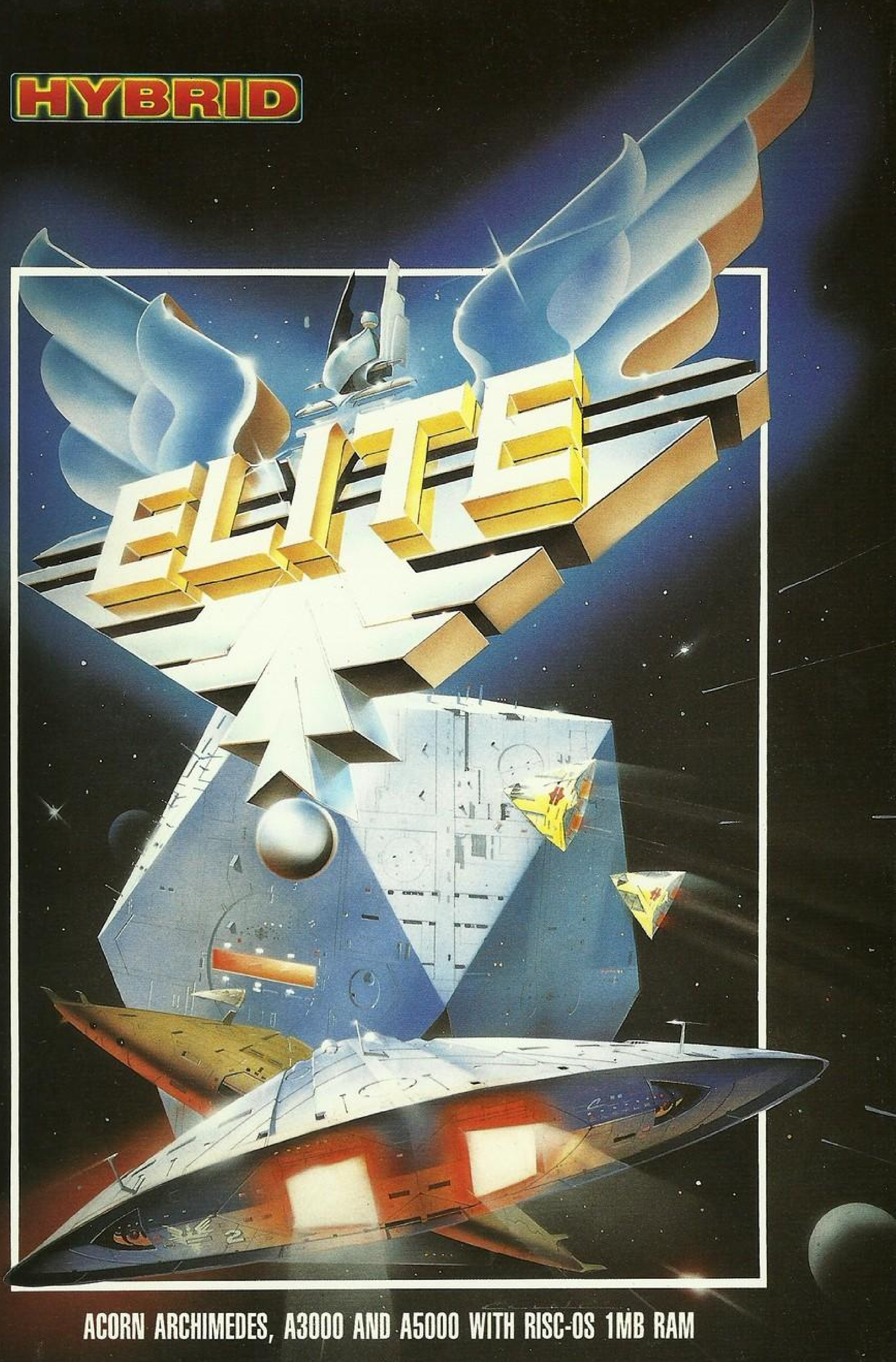
HYBRID



ACORN ARCHIMEDES, A3000 AND A5000 WITH RISC-OS 1MB RAM

Good games come and go, and great ones last much longer, but only one can claim to be ELITE. Generations have played it, some have even beaten it, but none have tired of it.

Now, the original award-winning formula of space exploration, trading and combat has been enhanced and extended as never before, using the power of the Archimedes to present the ultimate computer game experience and, once again, the time-honoured challenge – have you got what it takes to become one of the Elite?

HYBRID

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software and documentation
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game design and concept
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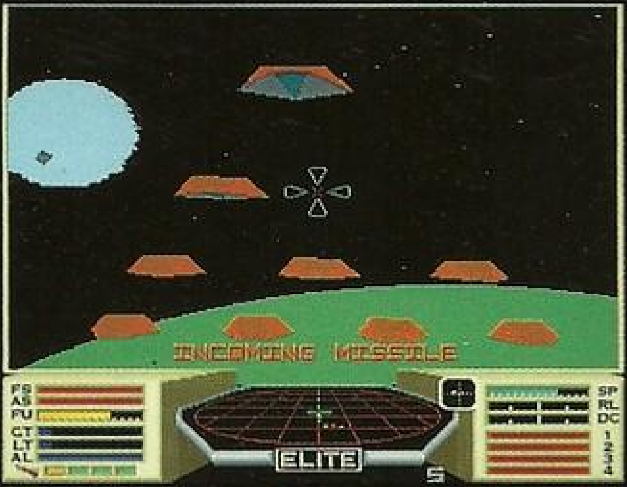
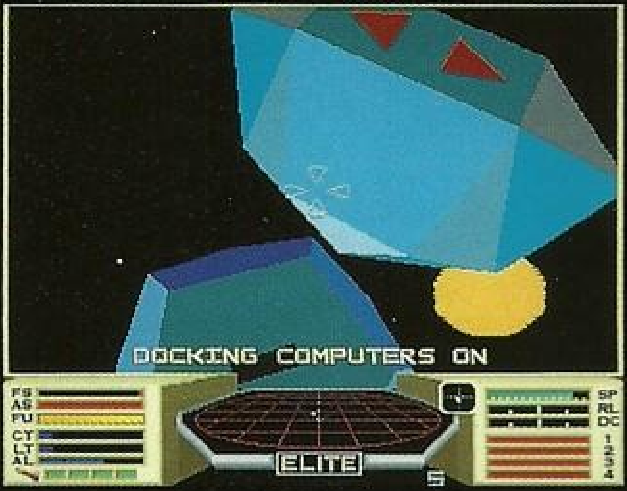
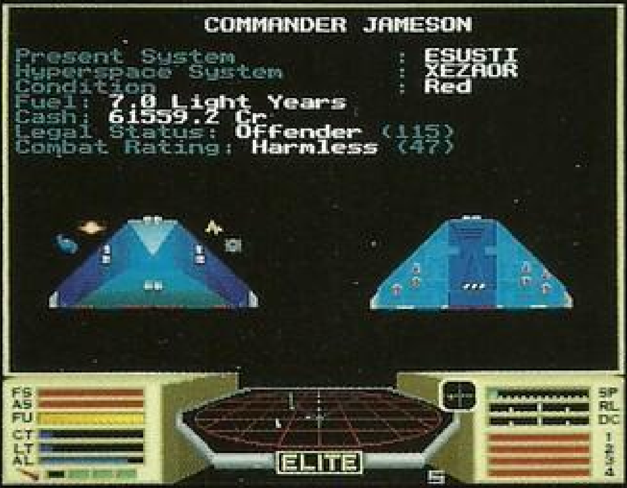


engage dozens of ship types in breath-taking interstellar battles



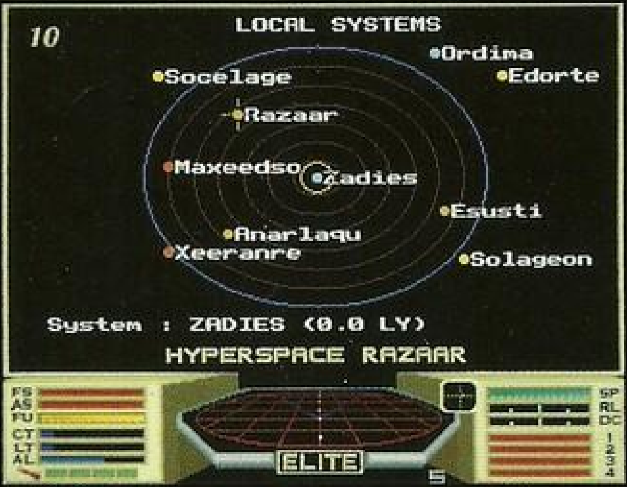
dock at orbiting space stations to re-fuel, equip and trade cargo



COMMANDER JAMESON

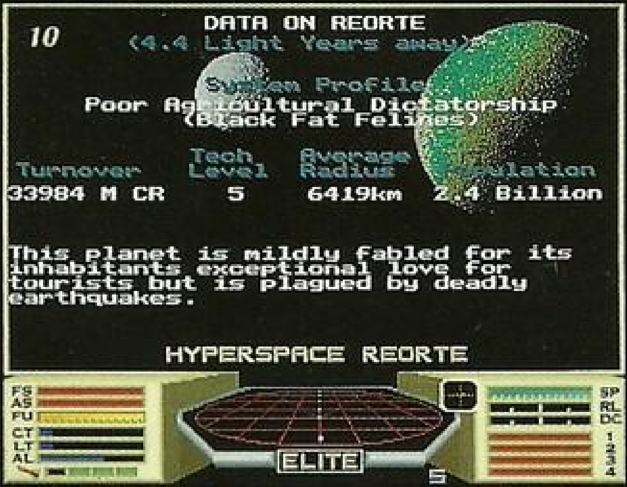
Present System : ESUSTI
Hyperspace System : XEZAOR
Condition : Red
Fuel: 7.0 Light Years
Cash: 61559.2 Cr
Legal Status: Offender (115)
Combat Rating: Harmless (47)

upgrade your ship with a dazzling array of high-tech weaponry



System : ZADIES (0.0 LY)
HYPERSPACE RAZAAR

search-out the best routes for trading, piracy or bounty hunting



DATA ON REORTE
(4.4 Light Years away)

System Profile
Poor Agricultural Dictatorship
(Black Fat Felines)

Turnover	Tech Level	Average Radius	Population
33984 M CR	5	6419km	2.4 Billion

This planet is mildly fabled for its inhabitants exceptional love for tourists but is plagued by deadly earthquakes.

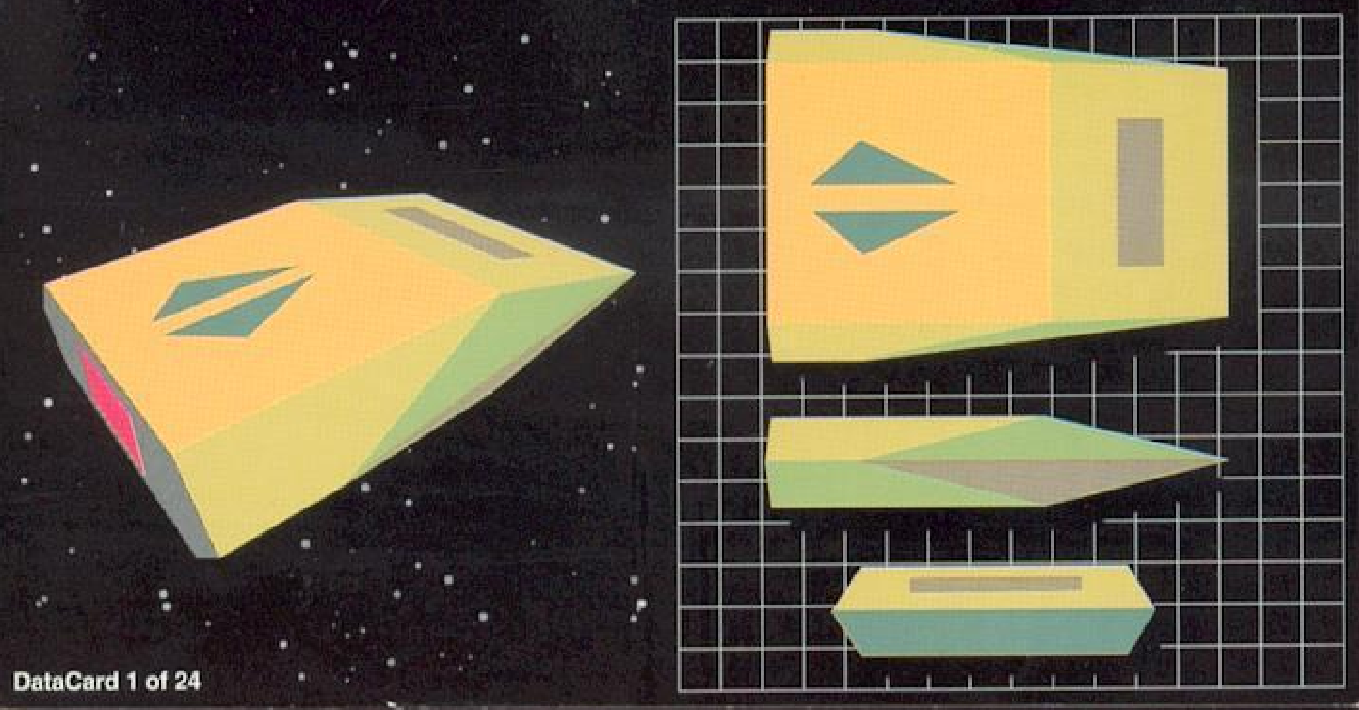
HYPERSPACE REORTE

explore two thousand star systems spread over eight galaxies

ADDER

OFFRAT: 2.24 DEFRAT: 5.10

The Adder is manufactured by Outworld Workshops in their newly based laboratories on Eddi. Outworld still insist that their clientele are mostly traders, but Adders are generally flown by pirates. Pregg's 'wingfolding' system effectively doubles the fore and aft shield strength giving the Adder a high DefRat.

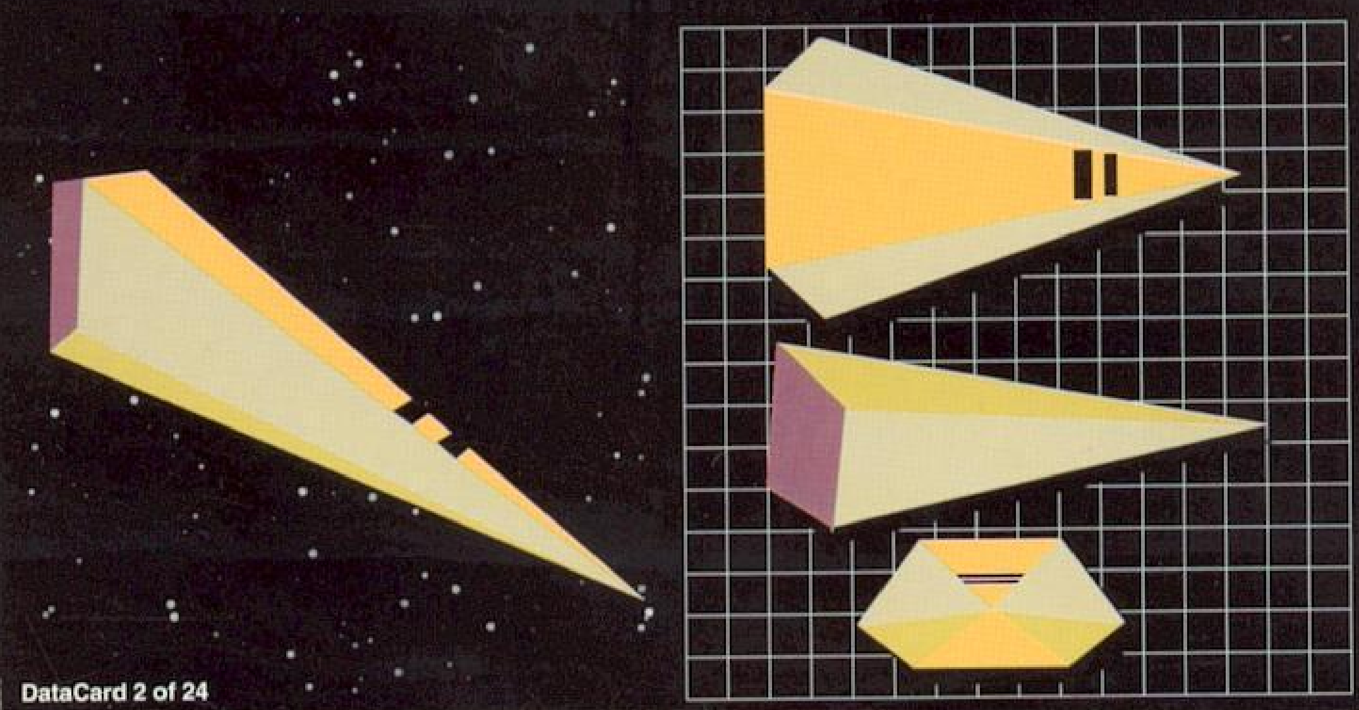


DataCard 1 of 24

ANACONDA

OFFRAT: 2.20 DEFRAT: 6.90

The Anaconda, dubbed the 'metal asteroid' because of its handling, is RimLiner's only true freighter. Because this craft can carry only weak lasers and two missiles, Anaconda pilots usually employ loner fighter escorts to protect the contents of its huge cargo hold.

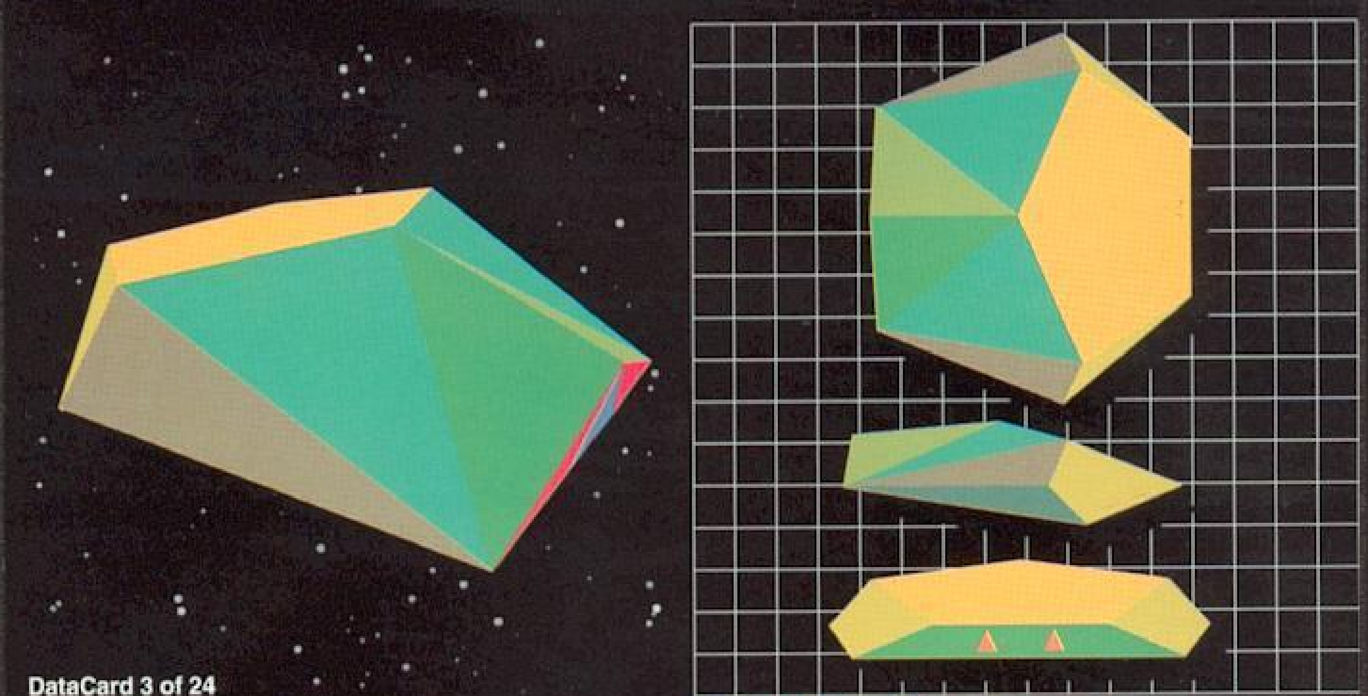


DataCard 2 of 24

ASP II

OFFRAT: 2.24 DEFRAT: 5.20

This Galactic Navy vessel incorporates self-destruct devices which are primed to activate when astrogation controls are used by unfamiliar hands. Amphibioid pirates are adept at dismantling these booby-traps and often lure genuine Navy Commanders into slaughter-rinks.

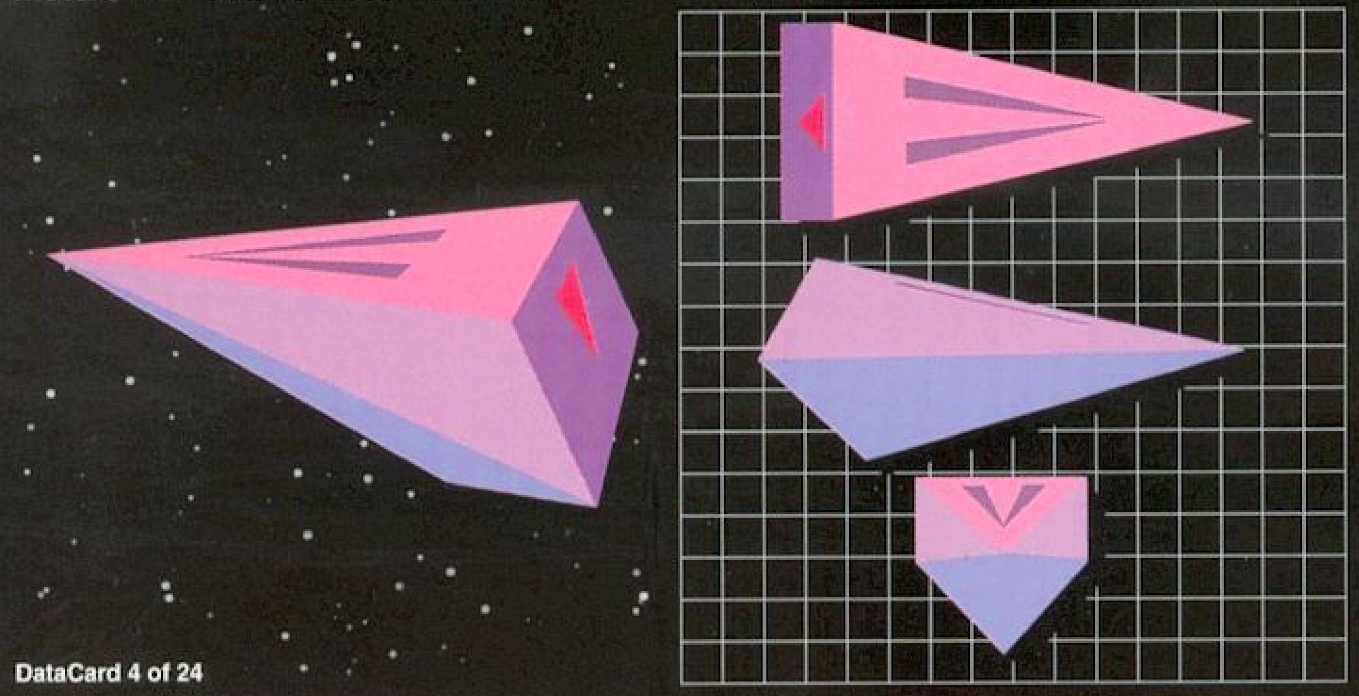


DataCard 3 of 24

BOA II

OFFRAT: 2.02 DEFRAT: 4.80

The Boa II sees the further development of Commander Monty's recommendations. Weight has been lost by reducing the number of Ames Drive motors from four to three. This has allowed the Boa II to house a Hassoni-Kruger Burst Laser without becoming 'nose-heavy'. Berch Industries on Birera will respray any Boa.

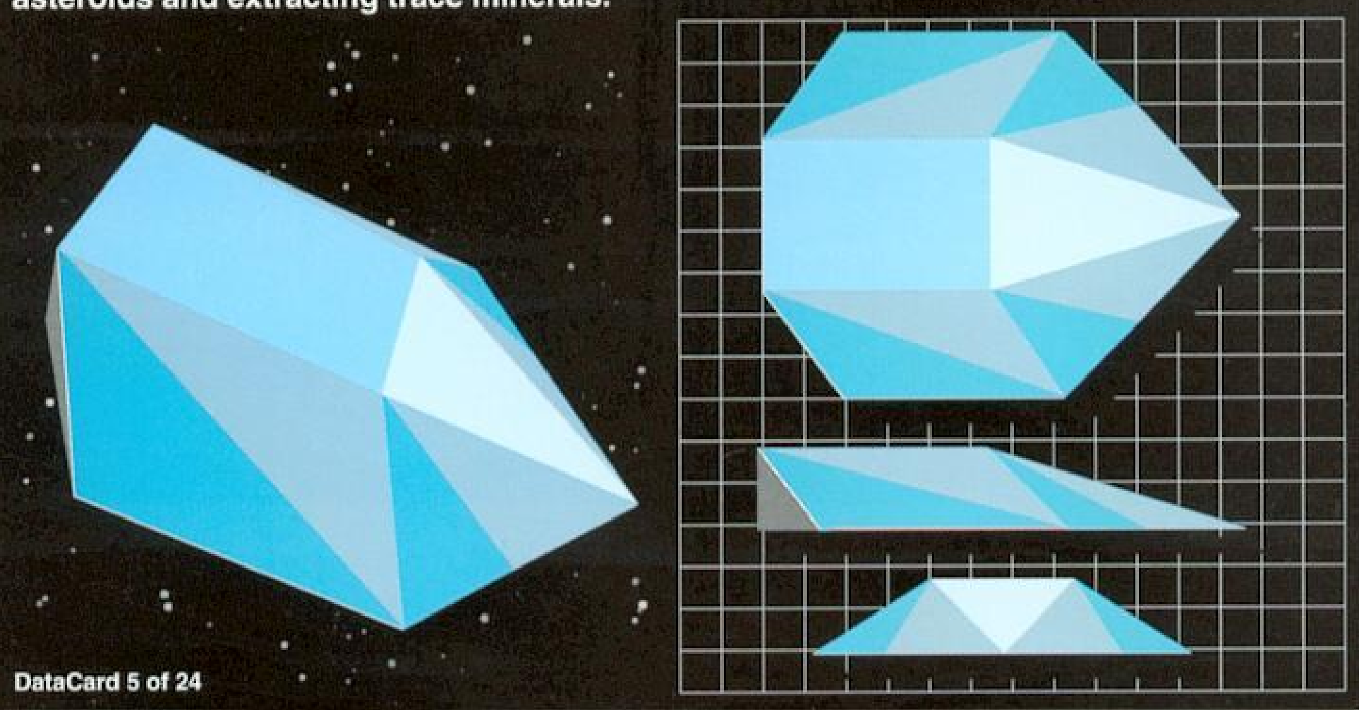


DataCard 4 of 24

BUSHMASTER

OFFRAT: 3.33 DEFRAT: 5.05

Bushmasters are only available to members of the Mining Guild. These peaceful ships, protected under GalCop statutes, plough through space, mining asteroids and extracting trace minerals. Belters only attack when freeloading pilots steal their hard-earned profits. However, mining lasers aren't particularly worrying.

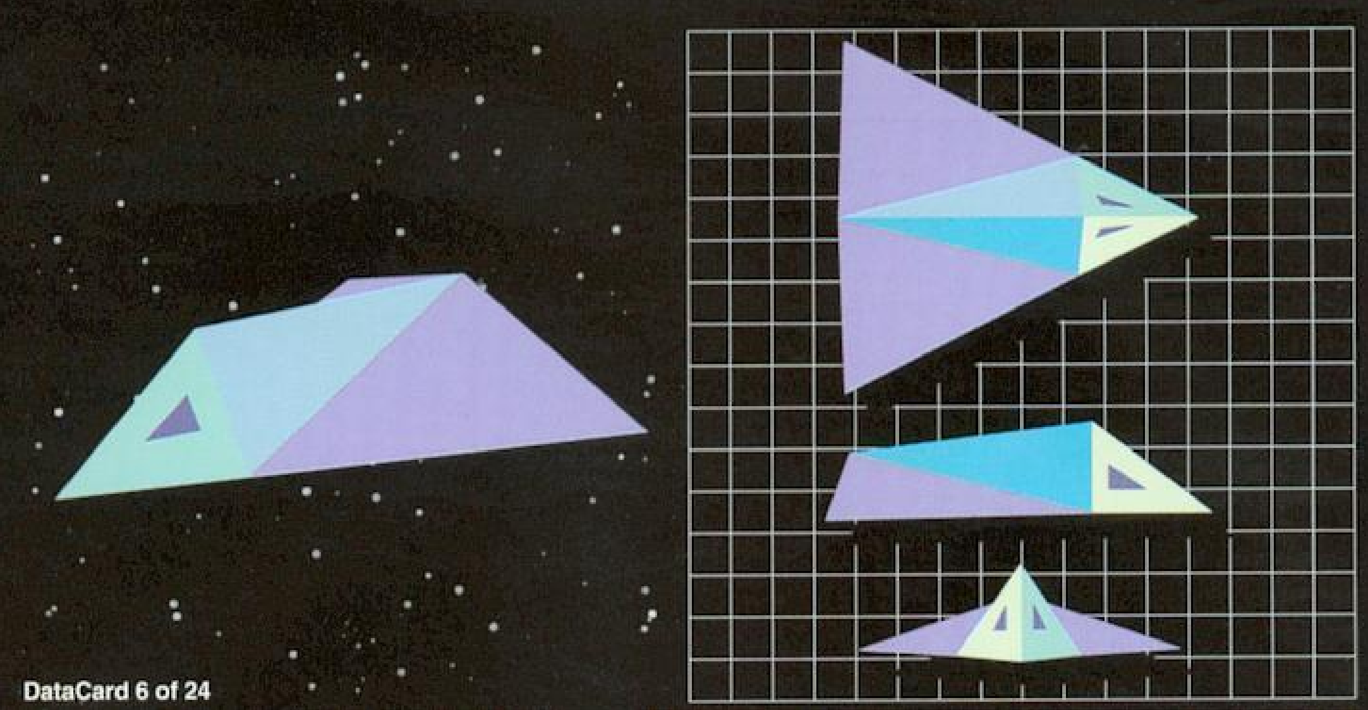


DataCard 5 of 24

CAIMAN

OFFRAT: 1.55 DEFRAT: 3.50

The Caimen are a race whose credo is piracy. This ship is of their own design and so lacks some of the more technically advanced equipment such as Escapsules, ECM, etc. Attacking in swarms (to protect their weak shields), they attempt to destroy in the first strike-run by using their Ni-L8 lasers .

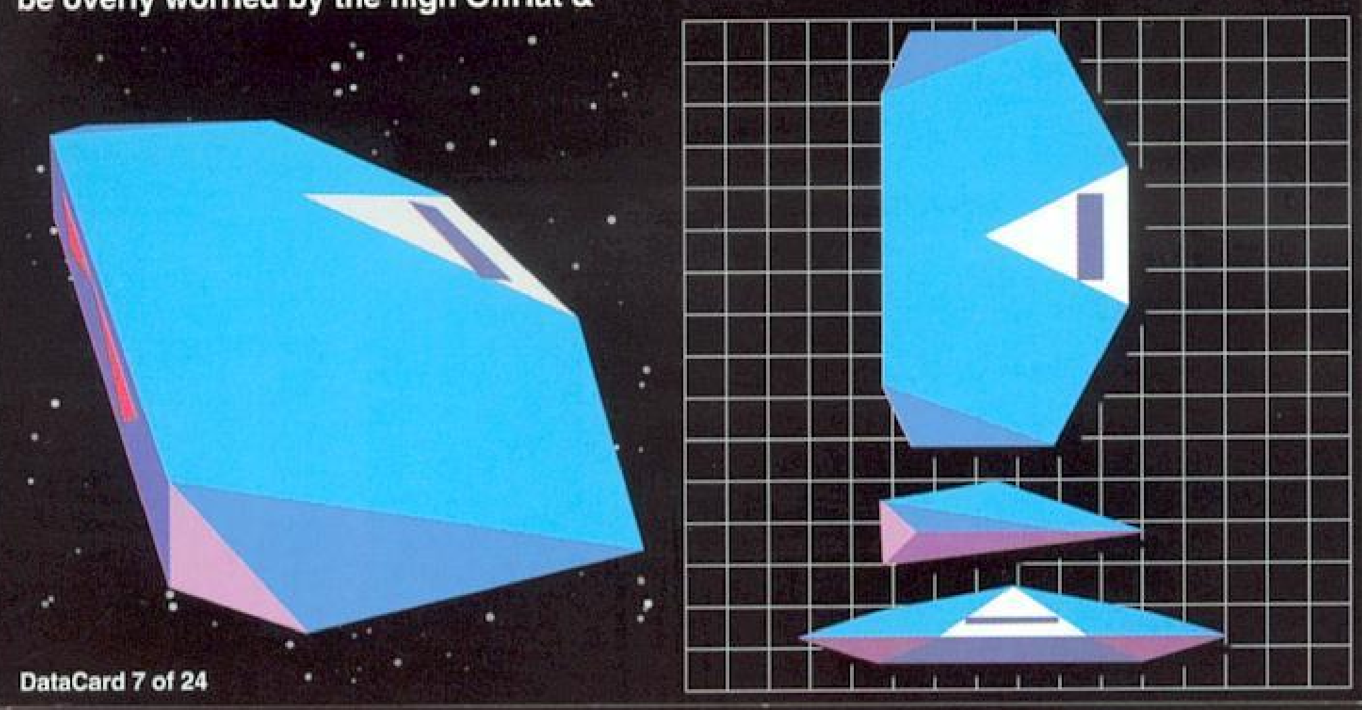


DataCard 6 of 24

COBRA MKI

OFFRAT: 4.62 DEFRAT: 4.75

Paynou, Paynou & Salem have now ceased Cobra Mk I production. Spare parts are hard to find, and tend to be of dubious quality. Commanders should not be overly worried by the high OffRat & DefRat. Most Mk I pilots are more concerned that their RIF generators will last to the next space station than with killing nosey traders.

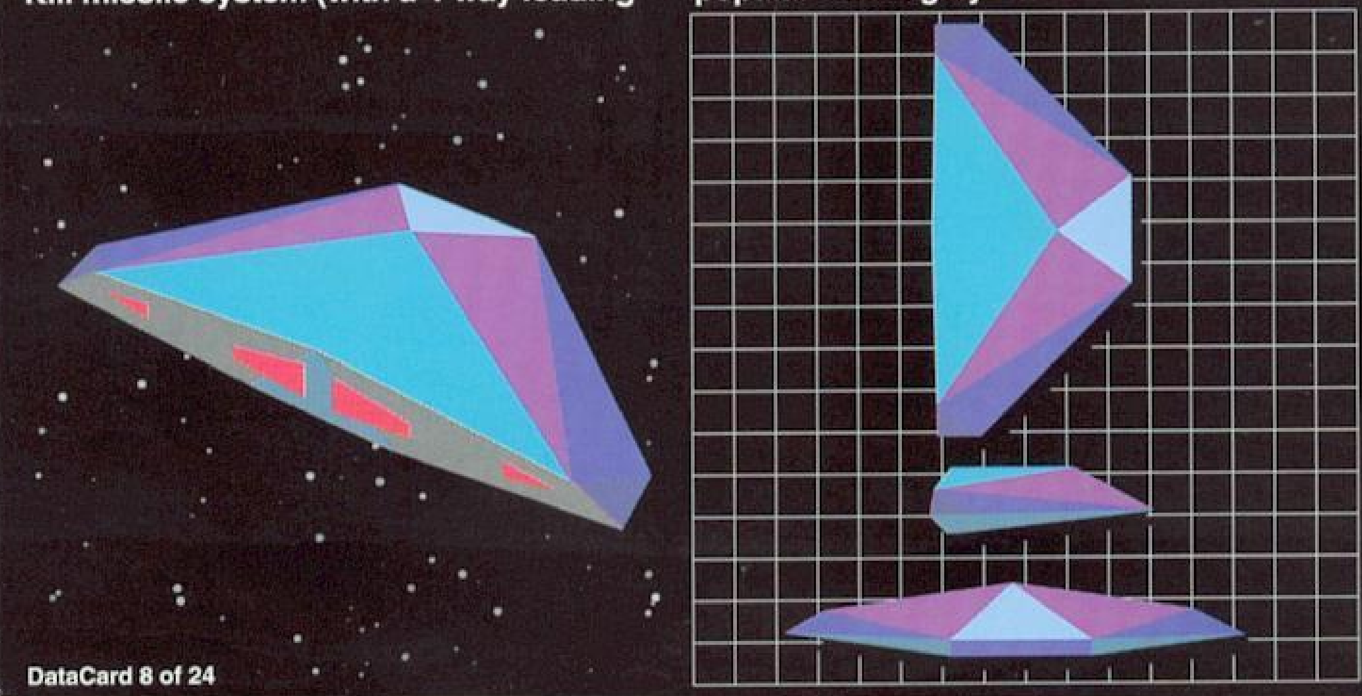


DataCard 7 of 24

COBRA MKIII

OFFRAT: 4.72 DEFRAT: 5.05

The Cobra Mk III is much favoured by lone traders who wish to combine superior combat qualities with cargo hold capacity. The Lance & Ferman Seek-and-Kill missile system (with a 4-way loading rack), combined with the Irrikan X3 drive place this older craft into the category of 'iron-ass'. As one of the few models with four laser mountings, it is particularly popular with highly-rated commanders.



DataCard 8 of 24

COPPERHEAD

OFFRAT: 2.73 DEFRAT: 3.40

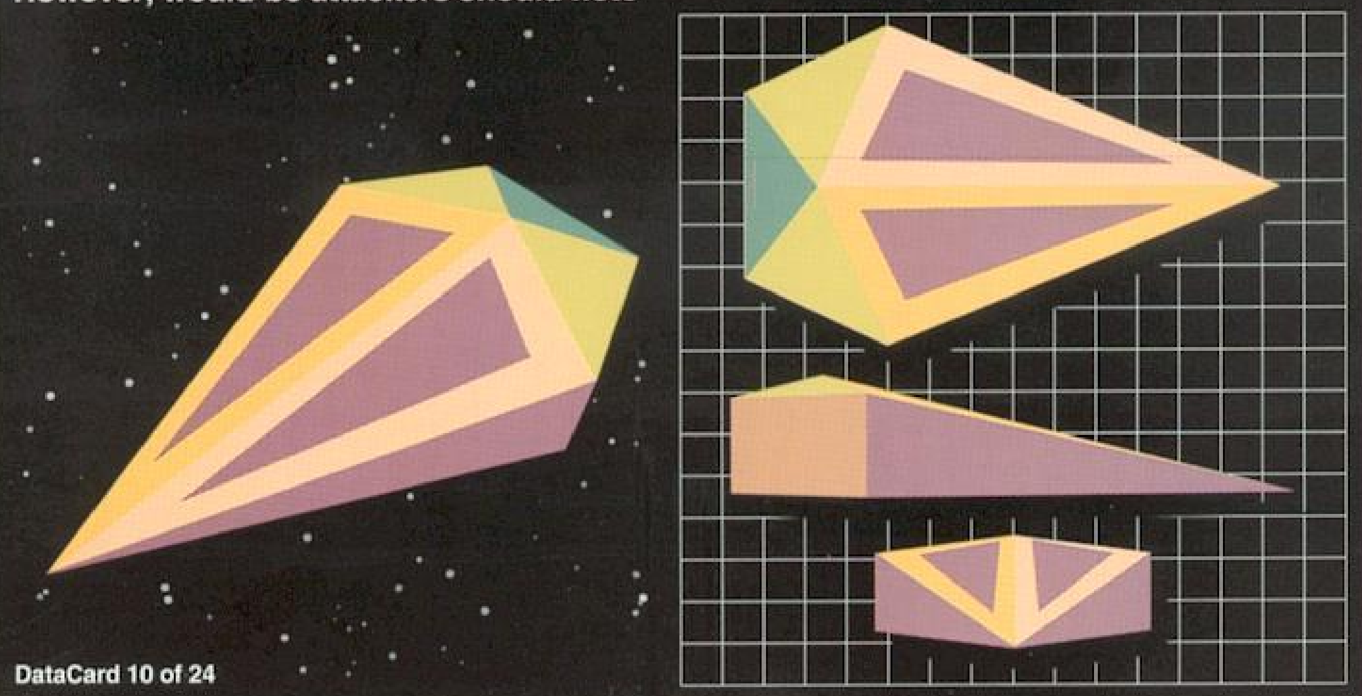
Originally designed for low-altitude planet-skimming, the Copperhead became confined to space use after problems with corrosion of its copper-based hull material. Due to it being equipped with a rejected precursor of the Cobra Mk III Mous, this ship is often observed flying rather erratically. However, do not mistake it for a 'crazy craft'.

DataCard 9 of 24

FER-DE-LANCE

OFFRAT: 4.00 DEFRAT: 5.35

The Fer-de-Lance is a wealthy man's ship - a status symbol. Its poor manoeuvrability and feather-lasers would appear to make it an irresistibly easy target. However, would-be attackers should note that the high DefRat afforded by the ParaVee helix shields give Fer-de-Lance pilots plenty of time to summon their well-paid 'friends' in GalCop.

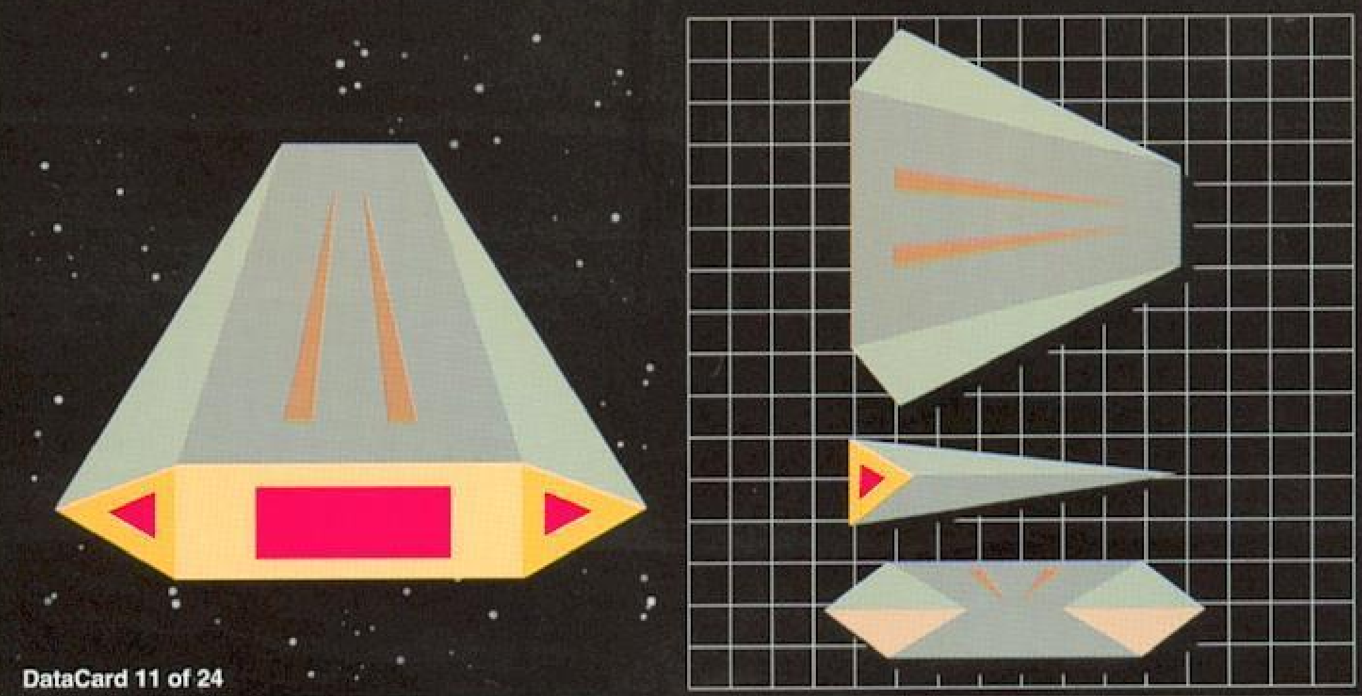


DataCard 10 of 24

GECKO

OFFRAT: 4.00 DEFRAT: 5.35

The Gecko has a chequered history of backyard manufacture and photocopied blueprints. It has thus evolved into the craft flown by so many pirates today. Commanders are advised to remain docked during the infamous Gecko enthusiast Arries-Diquer rally.

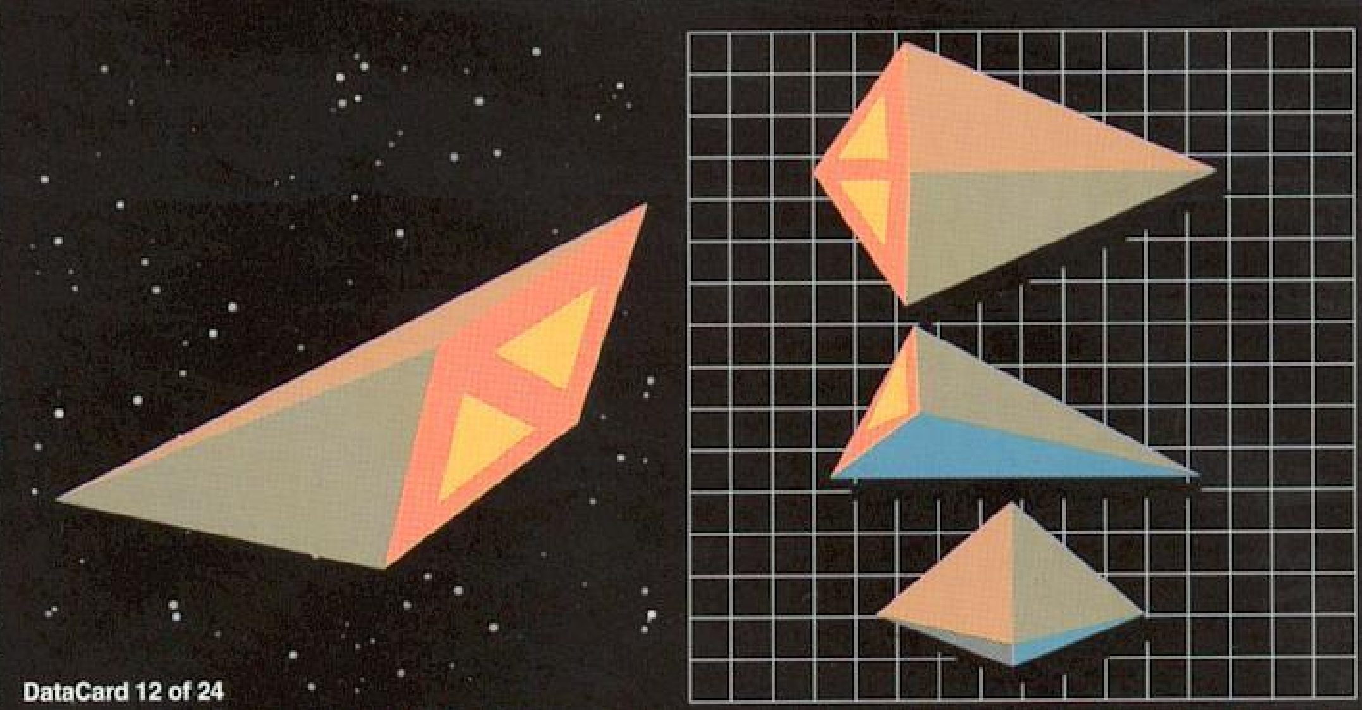


DataCard 11 of 24

HOGNOSE

OFFRAT: 0.00 DEFRAT: 2.70

Developed by the Galactic Navy for target practice. Having no missiles, lasers or substantial ships, the Hognose is little more than laser fodder. An entire hanger of these pathetic craft was bought by a missionary sect who now use them to 'spread the word'.

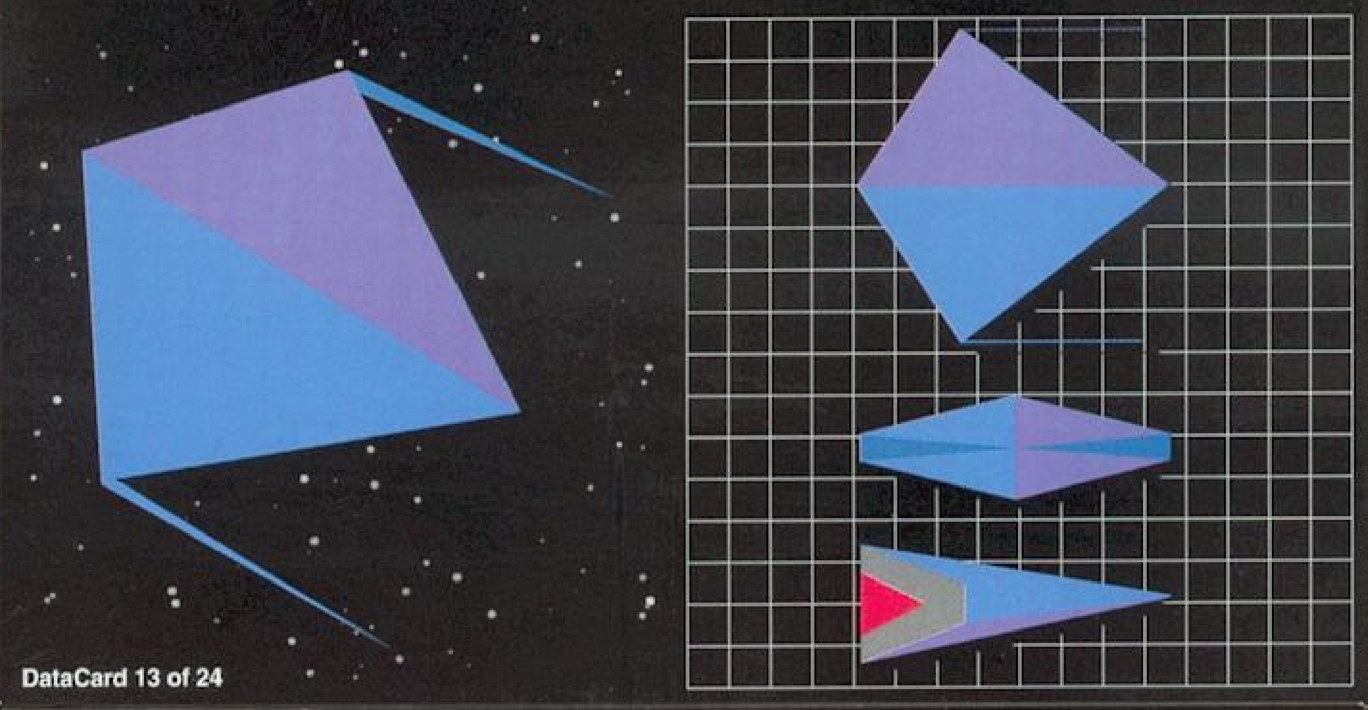


DataCard 12 of 24

KRAIT

OFFRAT: 2.02 DEFRAT: 3.25

The Krait's SpinIonic TP14 drive motors and laughable Ergon laser should not pose any serious threat to Mostly Harmless Commanders. With such poor deLacy shields a Krait is seldom seen alone. This ship is obsolete.

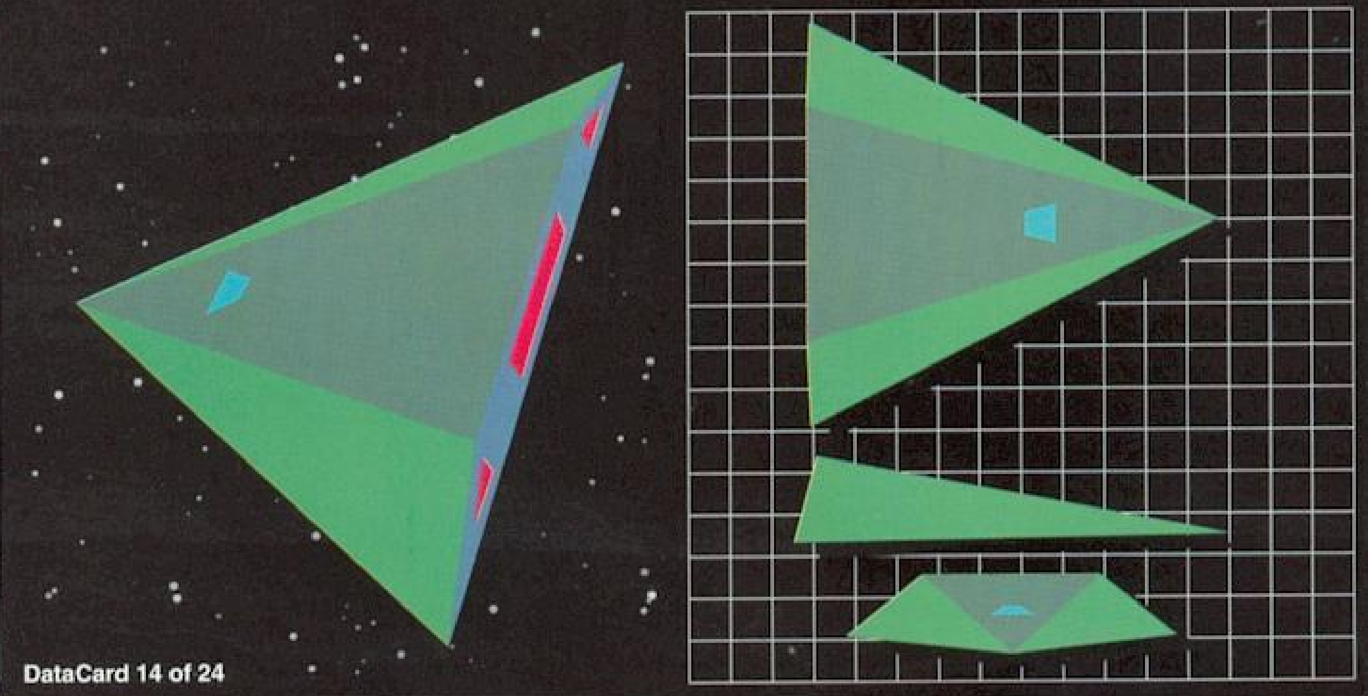


DataCard 13 of 24

MAMBA

OFFRAT: 1.35 DEFRAT: 3.35

The Mamba is a fast and very manouverable ship originally designed for racing. Conversion into a more menacing form was hampered by a problem - radiation from Radder's Fluxloc shields often caused missiles to confuse source with target. Thus the Mamba was left barren with an obviously low OffRat.

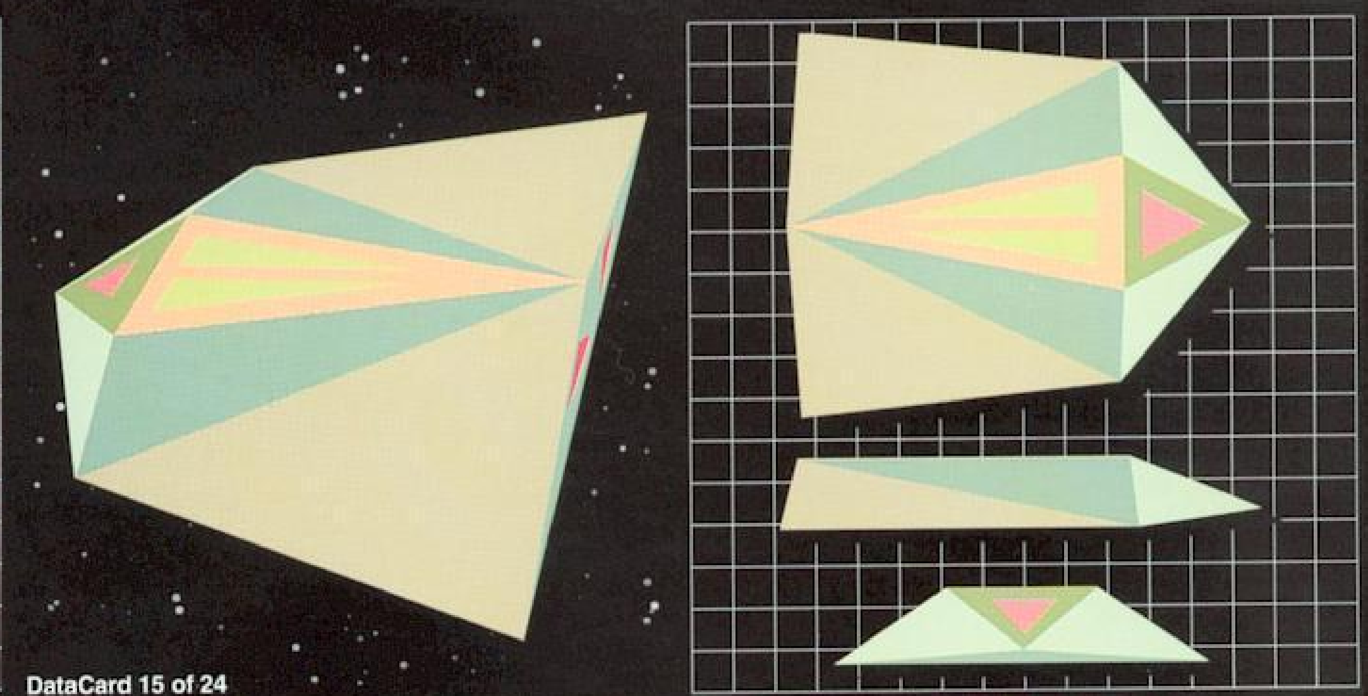


DataCard 14 of 24

MOCCASIN

OFFRAT: 2.24 DEFRAT: 5.10

The Moccasin is one of the very latest in 'fashion' ships. The craft was designed not by ship-builders but by Zacariah Design Inc. (responsible for the seat in Cobra Mk III's). As a result of this the ship has a low OffRat, suitable only for traders. Its cousin, the Urutu, is often bought by bounty hunters as a second cruiser craft.

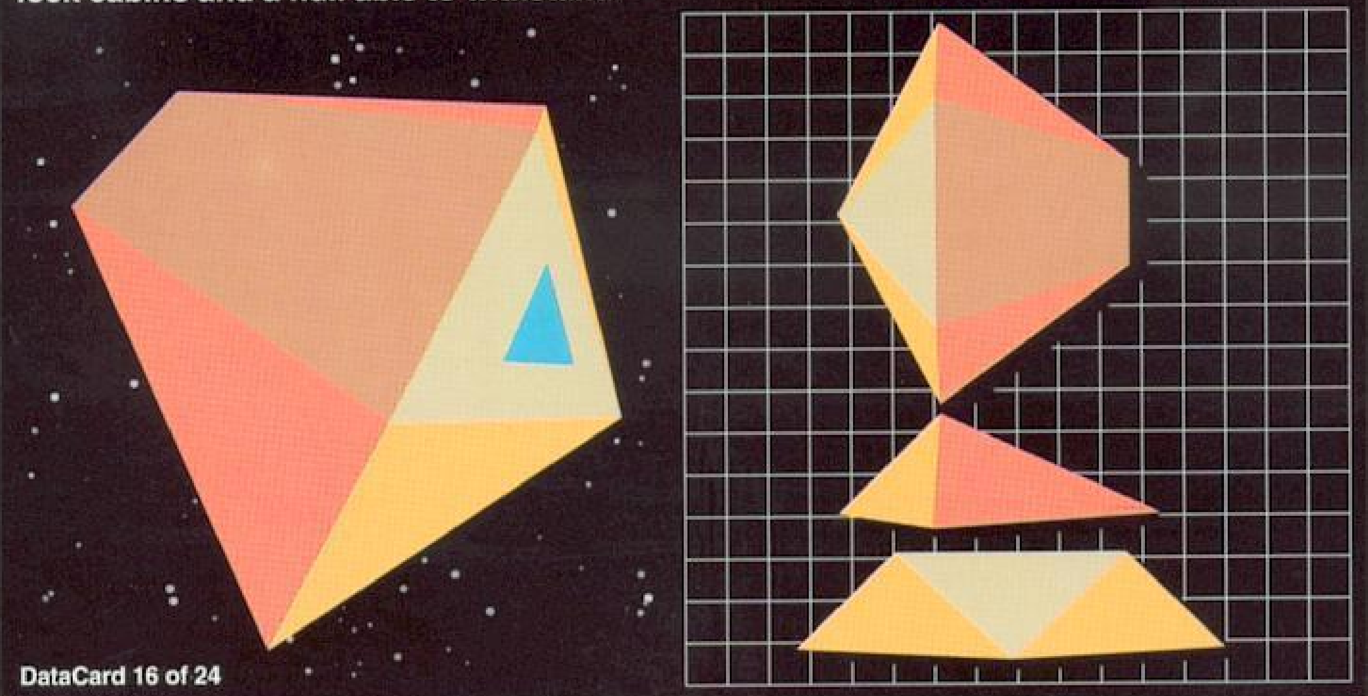


DataCard 15 of 24

MORAY

OFFRAT: 4.00 DEFRAT: 5.35

Initially a submarine flying boat, the Moray SFB's operations were soon extended by Marine Trench and the craft became the 'StarBoat'. With orange flood-lock cabins and a hull able to withstand 5500 fathoms, the 'StarBoat' is almost exclusively used by aquatic lifeforms. Its high DefRat is mainly due to this pressure-shielded hull.

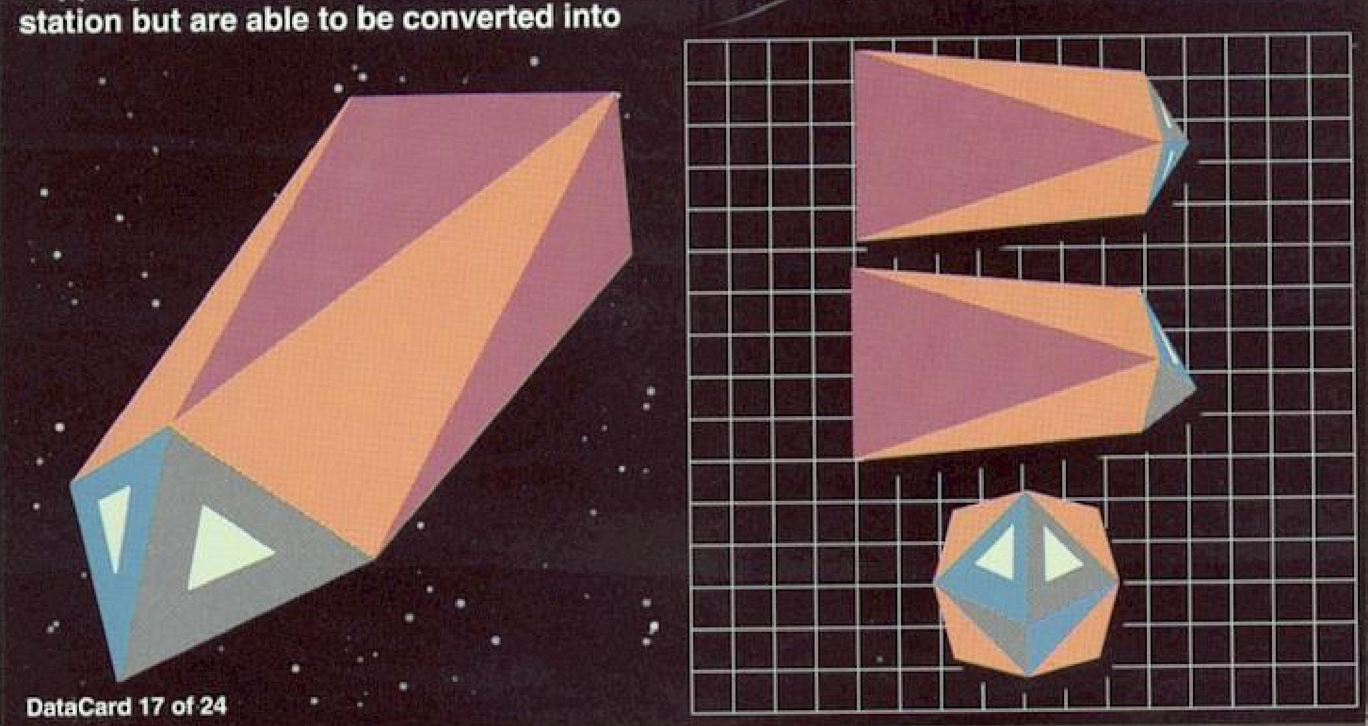


DataCard 16 of 24

ORBIT SHUTTLE

OFFRAT: 0.00 DEFRAT: 3.30

These unarmed and unmanned craft are built under license in every planetary system. They are primarily used for hopping between planet and space station but are able to be converted into hospital ships and orbiting prisons. Favourite targets for small-time criminals because of their instaneous release of cargo, they are often escorted by fighters.

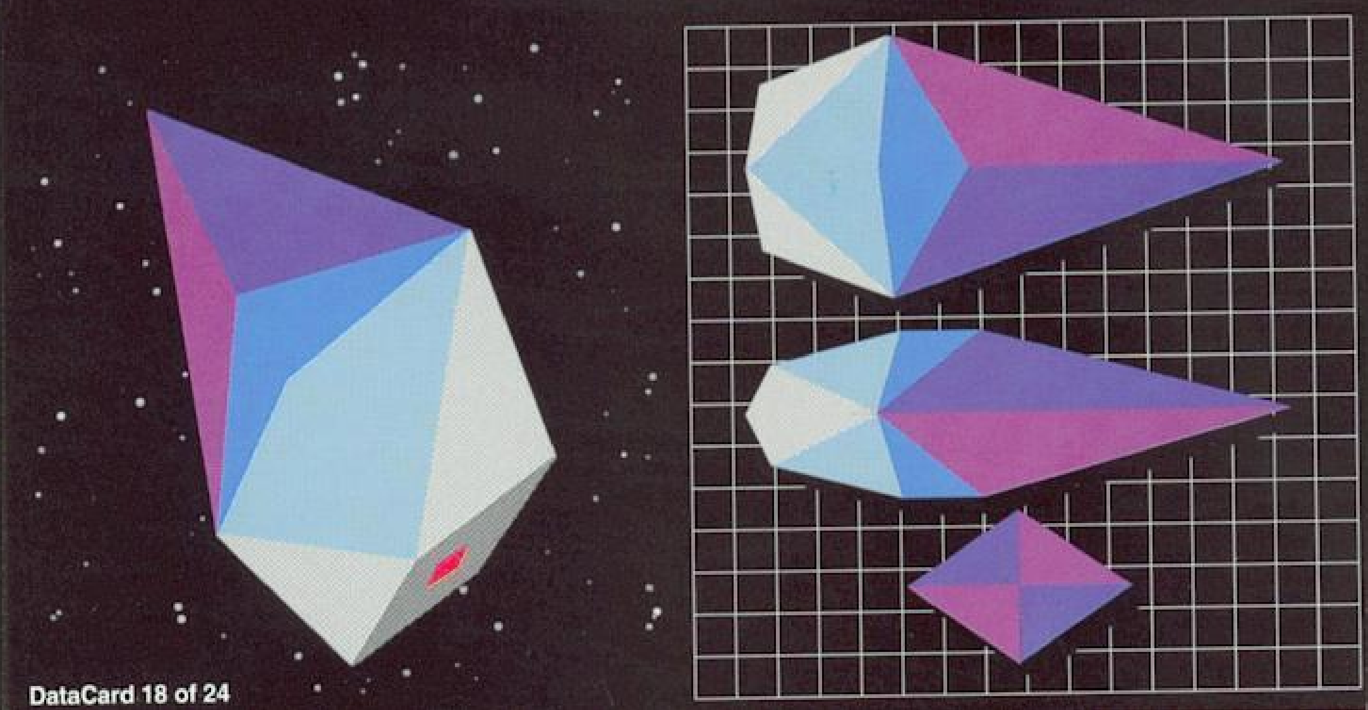


DataCard 17 of 24

PYTHON

OFFRAT: 2.73 DEFRAT: 4.25

Though slow and ponderous, this craft has powerful CC-Voltaire shields and Etag-Doow pulse lasers, earning it the name of the 'space porcupine'. With an enormous cargo capacity and Bi-scoops, the Python is commonly flown by spacecombers and Groigans.

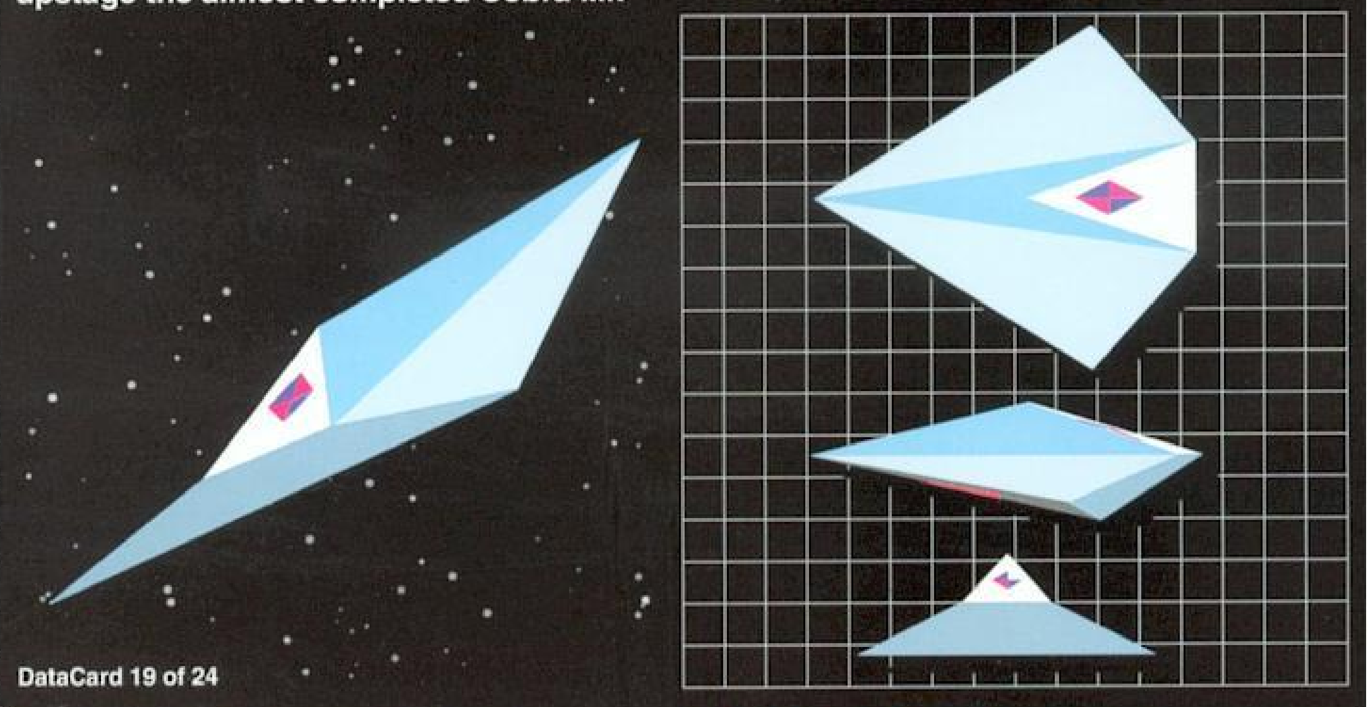


DataCard 18 of 24

RACER

OFFRAT: 2.24 DEFRAT: 5.10

Incorporating MultiStak cargo holds and the very latest in Feynman fuel scoops, the Racer is a vessel with class. Quatton Industries hope that their brain-child will upstage the almost completed Cobra Mk IV. This ultimate trader has a Venn-Roffey laser with homing sights and hardpoints prepared for L&F's multi-warheaded Mongoose missile.

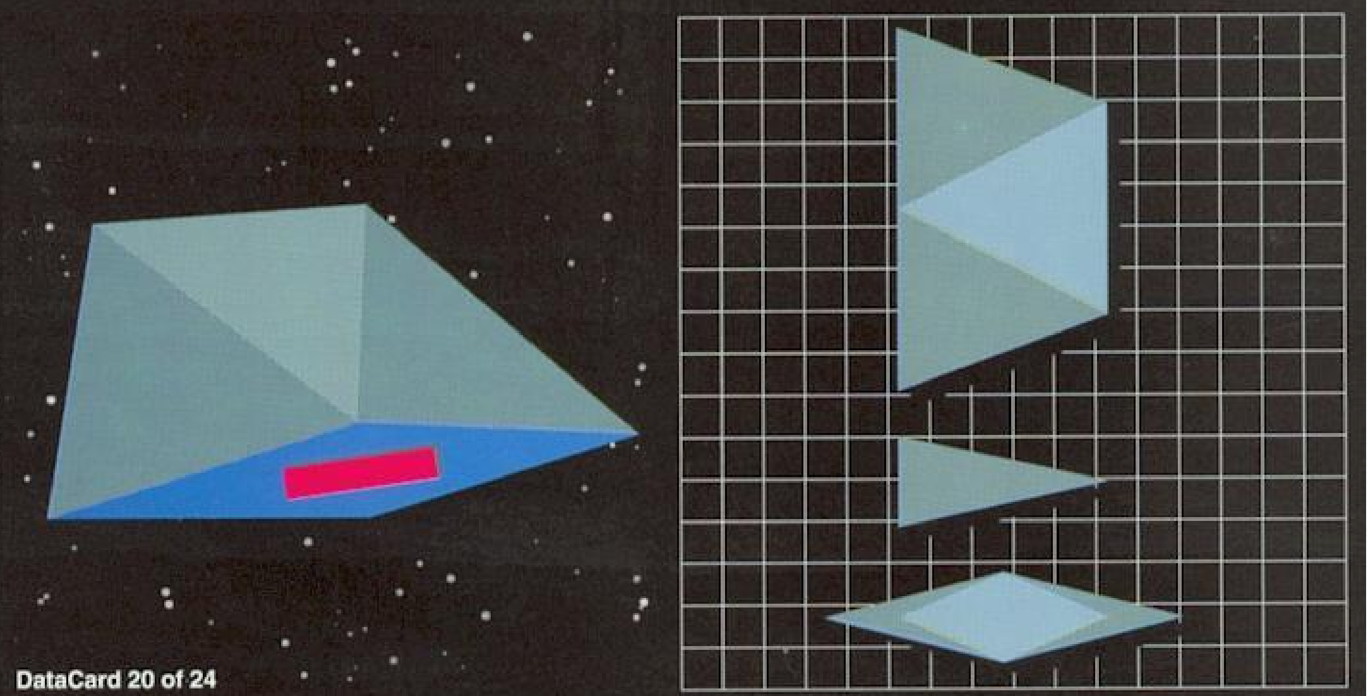


DataCard 19 of 24

SIDEWINDER

OFFRAT: 3.13 DEFRAT: 4.45

The Sidewinder is designed by Faulcon de Lacy and built to Galactic Navy specifications for a multi-purpose support craft. It is mainly used by pirates, mercenary loners or bodyguards and for reconnaissance and infantry air support. The hull is too small for the installation of fuel scoops or more than one missile pod.

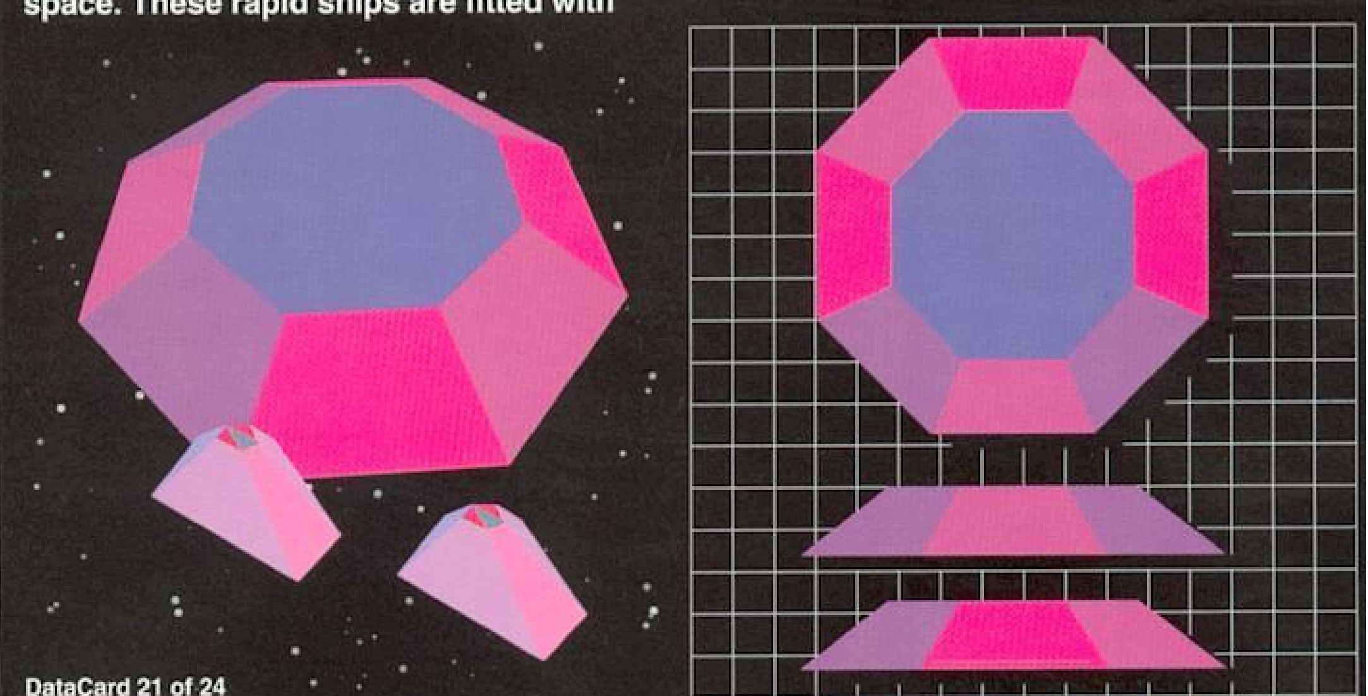


DataCard 20 of 24

THARGOID

OFFRAT: 3.91 DEFRAT: 4.60

Though most of the Thargoid Space Fleet is currently engaged by the Galactic Navy, a few of the smaller battle ships make occasional sorties into common space. These rapid ships are fitted with an anti-missile system and carry many small remote-controlled Thargons. Each of these terminator-craft has a single shield voiding laser.

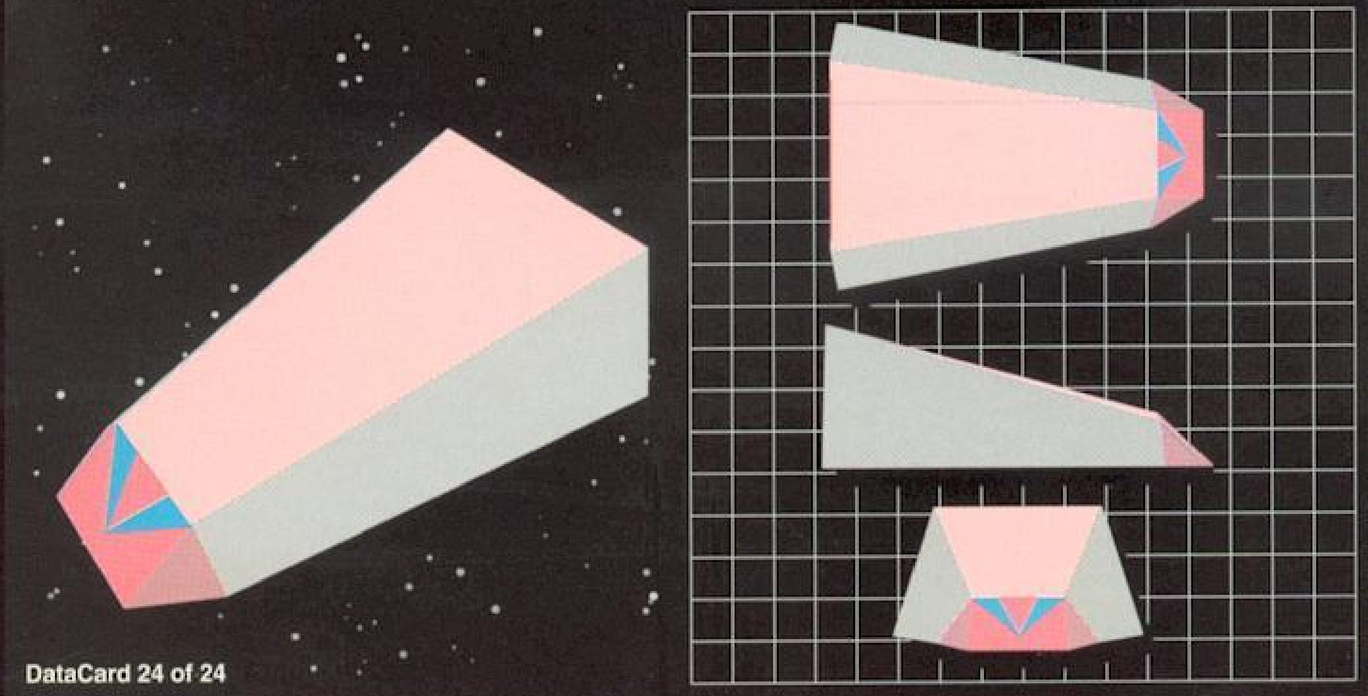


DataCard 21 of 24

WORM

OFFRAT: 0.00 DEFRAT: 3.30

This small landing craft is carried on larger ships as a lifeboat or general passenger landing craft. Lightly armed, the Worm is occasionally employed as an attack and/or decoy craft during combat situations. Manufactured to specific requirements dependent upon the Mother Ship, the Worm is highly adaptable.

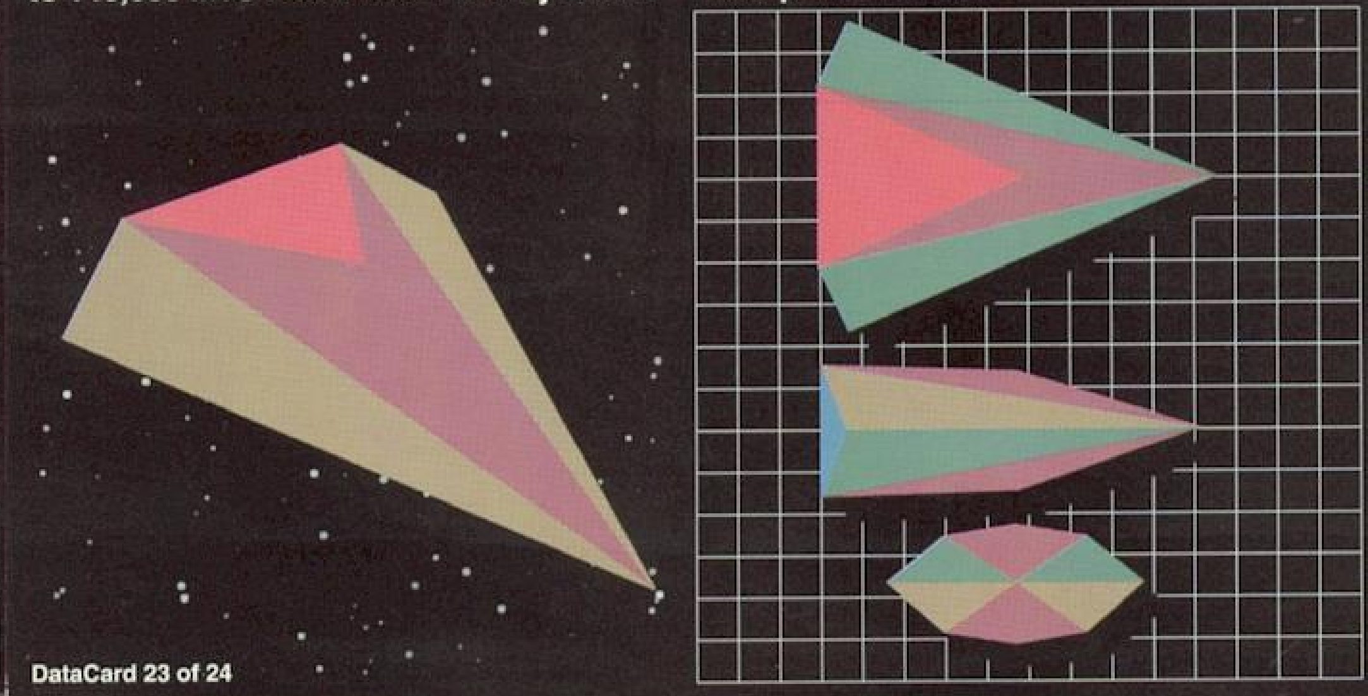


DataCard 24 of 24

VIPER

OFFRAT: 3.62 DEFRAT: 3.50

The Viper is a single-pilot craft, but can carry up to ten humanoid passengers. It has no cargo space, but has a 'tug' capability which can handle a ship of up to 140,000 MTS mass. With military lasers becoming the norm on pirate craft, Vipers fly in formation to protect their older Faulcon shields. The Viper is currently the standard patrol craft used by GalCop and local police forces.

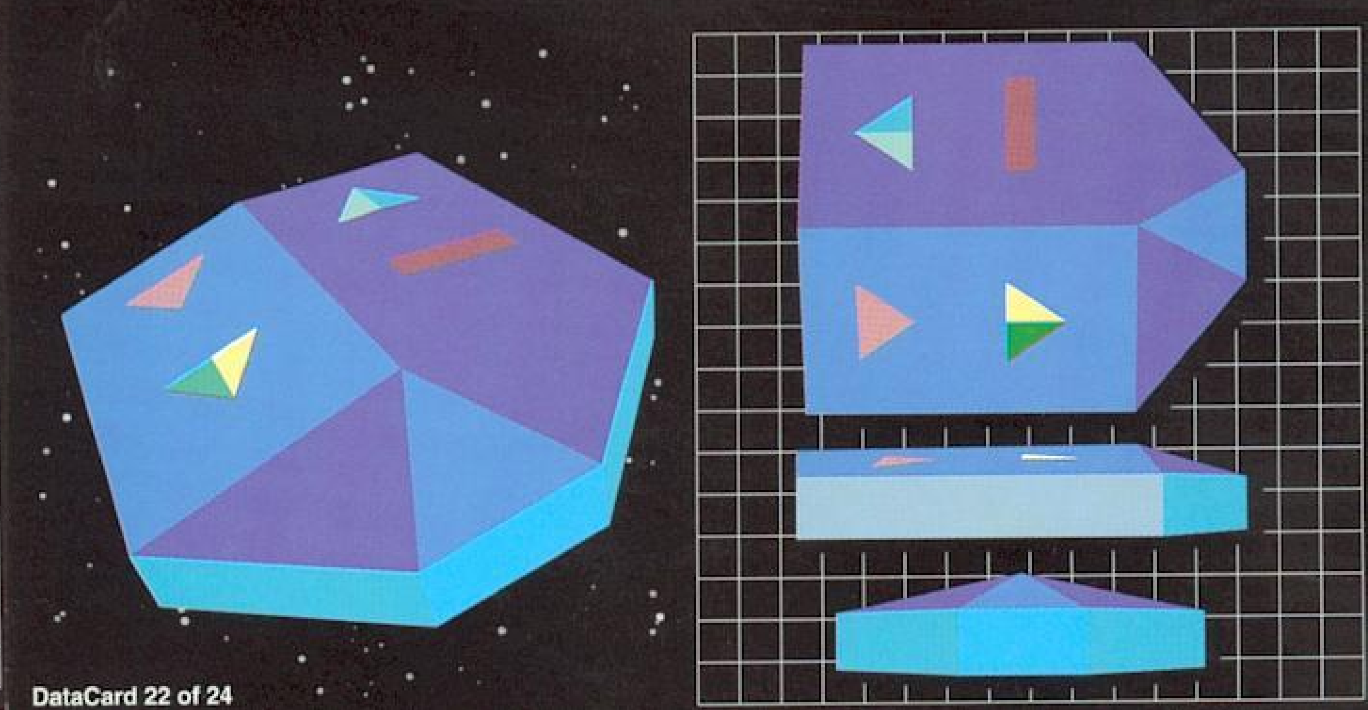


DataCard 23 of 24

TRANSPORTER

OFFRAT: 2.62 DEFRAT: 4.10

The Lakon Spaceways MC17 TransShut is the most commonly encountered intermediate range shuttle, with a range of 0.1LY and a full HiGrav Loading facility. It carries up to 100 passengers, and has a cargo capacity of 10 tonnes undefined bulk. It can land on asteroids, planets and can skim atmosphere.



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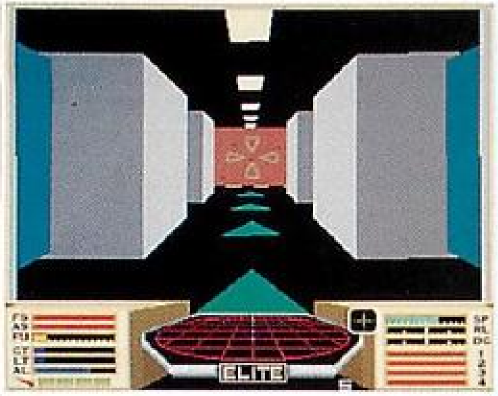

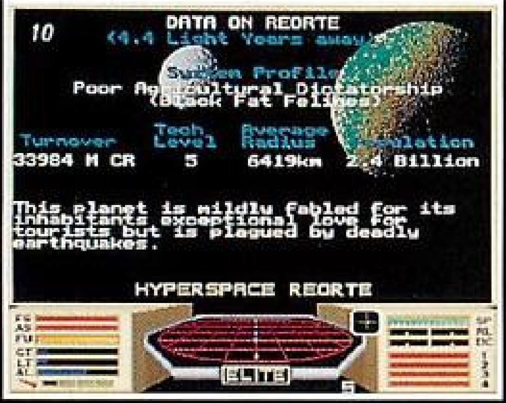

DATA ON REORTE

10 (4.4 Light Years away)

System Profile

Poor Agricultural Dictatorship

(Black Fat Felines)

Turnover	Tech Level	Average Radius	Population
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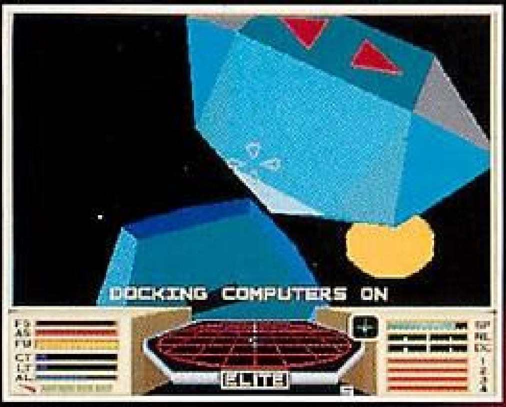
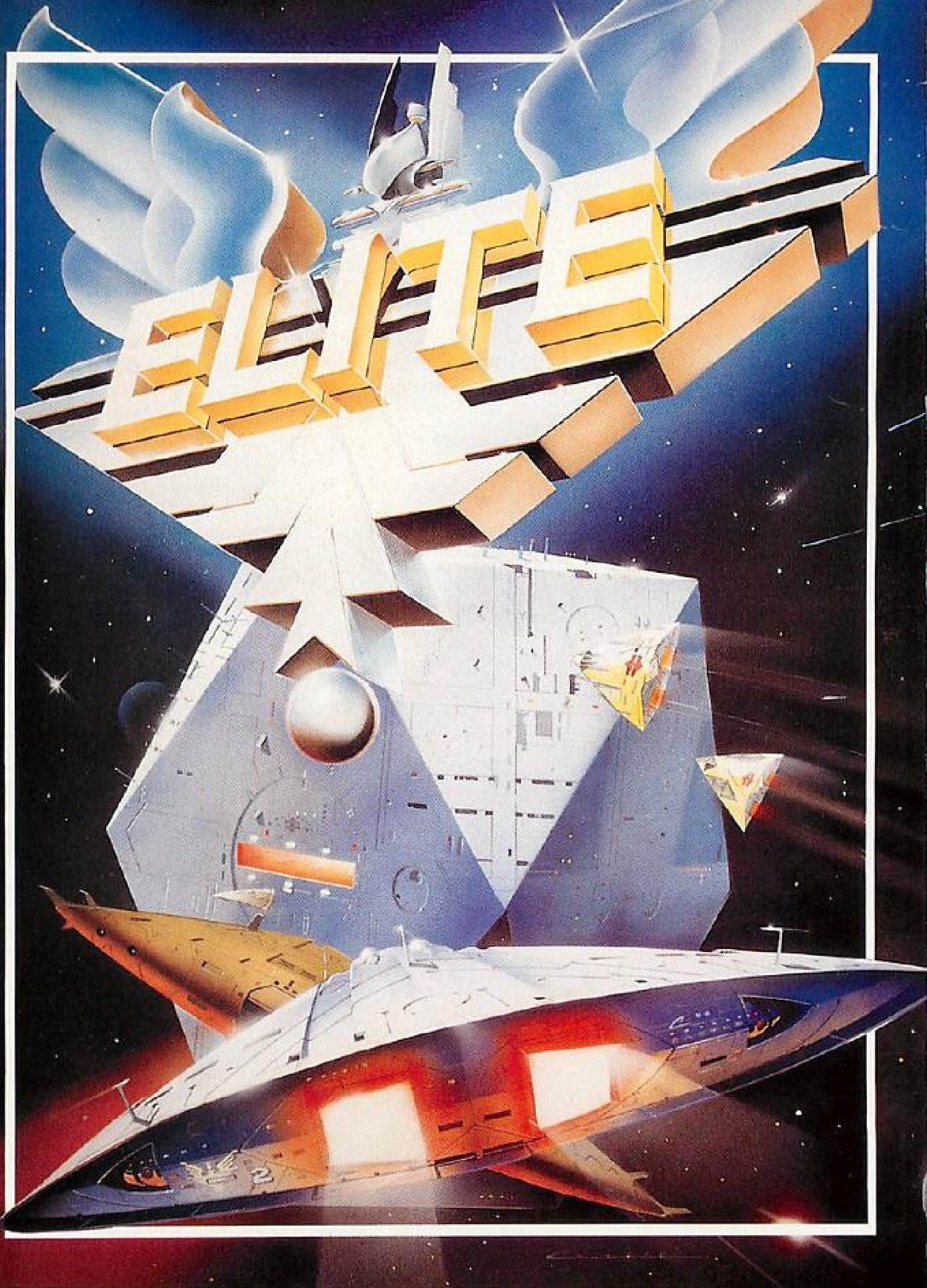
This planet is mildly fabled for its inhabitants exceptional love for tourists but is plagued by deadly earthquakes.

HYPERSPACE REORTE





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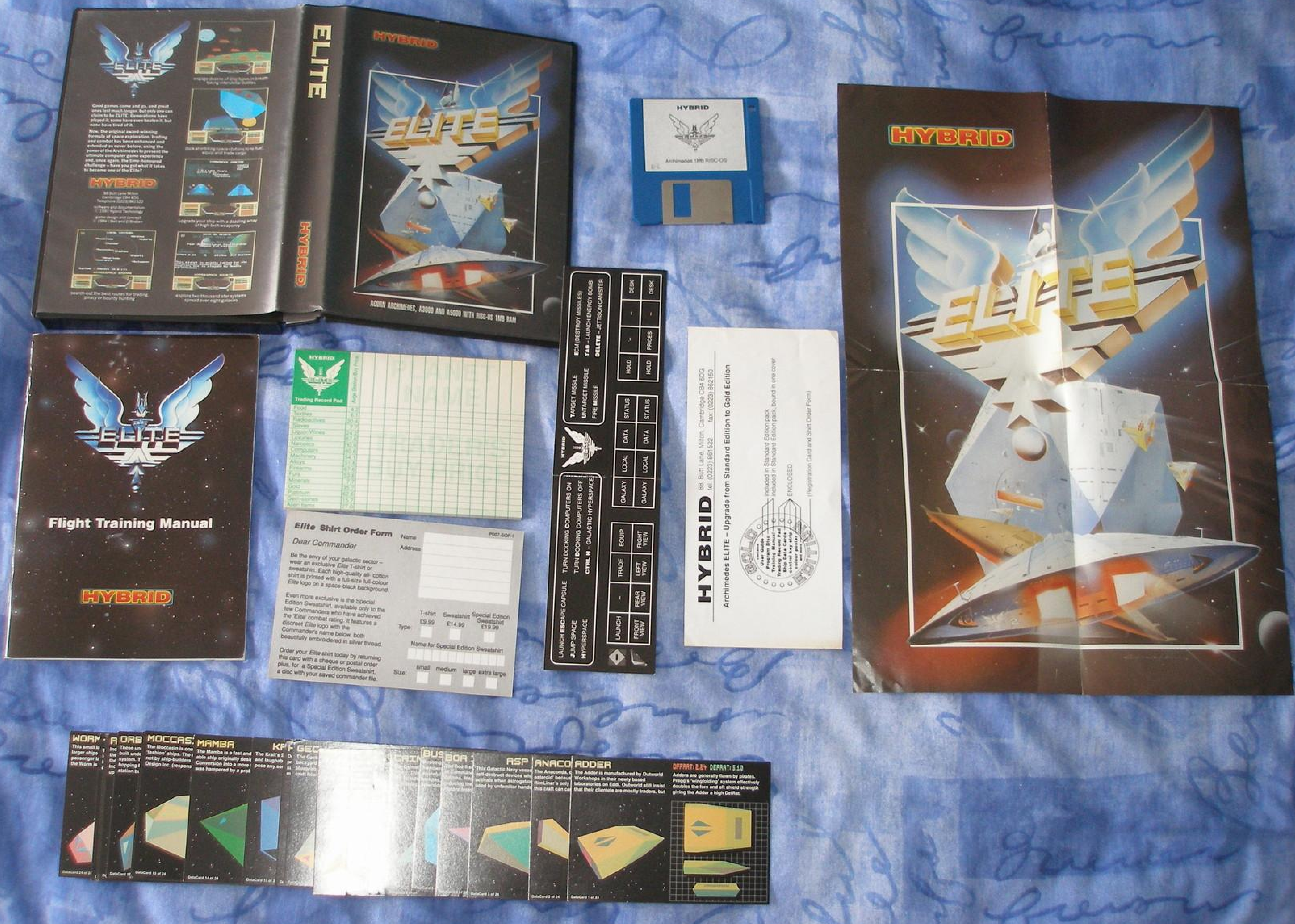

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JUMP SPACE
HYPERSPACE

TURN DOCKING **C**OMPUTERS ON
TURN **D**OCKING COMPUTERS OFF
CTRL H – GALACTIC HYPERSPACE

HYBRID

TARGET MISSILE
UNTARGET MISSILE
FIRE MISSILE

ECM (DESTROY MISSILES)
TAB – LAUNCH ENERGY BOMB
DELETE – JETTISON CANISTER

LAUNCH	–	TRADE	EQUIP	GALAXY	LOCAL	DATA	STATUS	HOLD	–	–	DESK
FRONT VIEW	REAR VIEW	LEFT VIEW	RIGHT VIEW	GALAXY	LOCAL	DATA	STATUS	HOLD	PRICES	–	DESK

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WORM
ORB
MOCCASIN
MAMBA
KRAIT
GECKO
ASP
ANACONDA
ADDER

This Galactic Navy vessel ... self-destruct devices which activate when astrogation ... used by unfamiliar hands

The Anaconda, ... asteroid' because ... RimLiner's only ... craft can ca...

ADDER

The Adder is manufactured by Outworld Workshops in their newly based laboratories on Eddi. Outworld still insist that their clientele are mostly traders, but

OFFRAT: 2.24 DEFRAT: 5.10

Adders are generally flown by pirates. Pregg's 'wingfolding' system effectively doubles the fore and aft shield strength giving the Adder a high DefRat.

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Elite

Author: Hybrid Technology

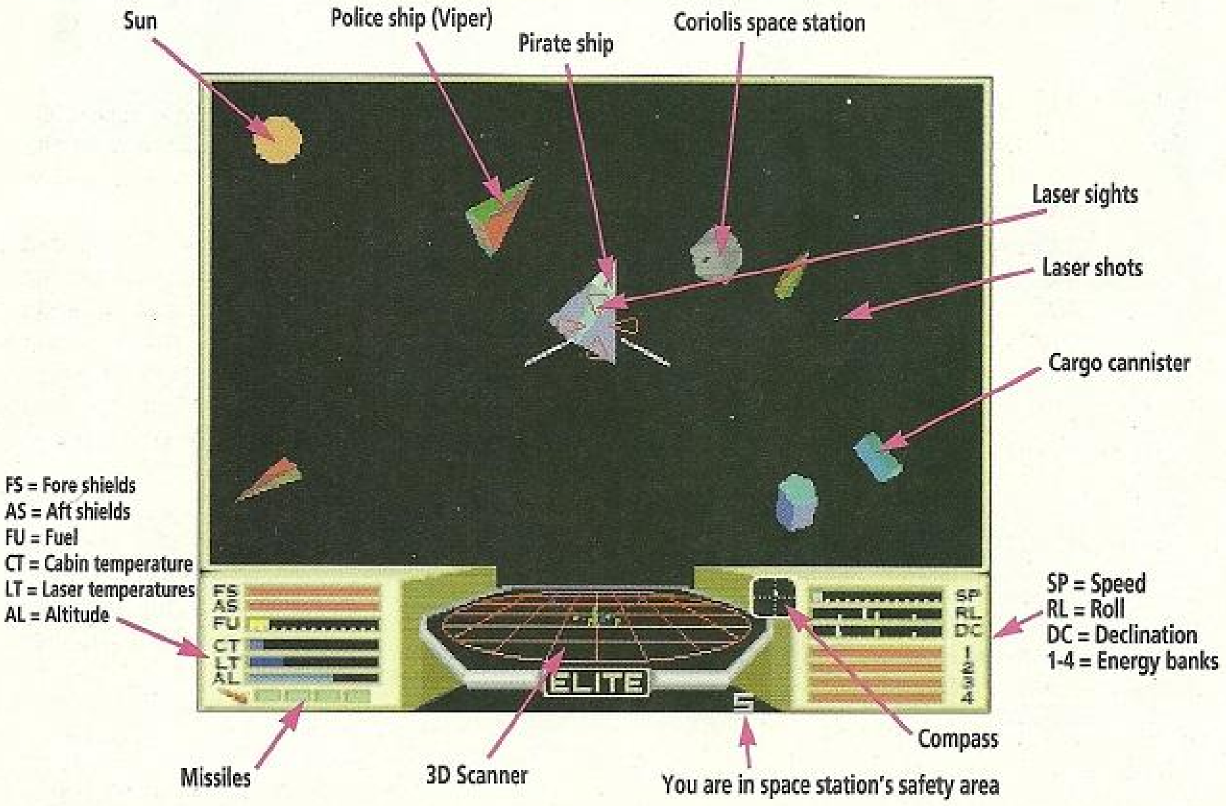


Figure 1: Flying your Cobra Mk III

ANYONE who's ever been into games will know about *Elite*. It's the best-selling Acorn game ever, and those of us who spent the wee hours zapping evil space pirates and surfing the solar waves when it first came out will understand why.

Elite will work on any Acorn machine, even 1Mb RISC OS 2 machines. Full instructions are included in the *Manual* directory, which contains ten text files which, together, make up the game manual. Here we concentrate mainly on flying your ship, which is skimmed over in the manual. There's also a keyship for the game supplied as a *Draw* file, which you can print out and use.

The text file *1Loading* gives full information on loading the game, changing preferences and saving commander files, but for now you can just run *Elite* by double-clicking on the *élite* application, so it installs on the icon bar. Those with RISC OS 2 will need to make sure their system folder contains the *CLib* module provided in the *System* folder on the disc.

Those with Falcon Analogue Joysticks can use them with this version of *Elite*: details can be found in the *Falcon* directory. *Elite* can also be used with the standard joystick ports on the A3010.

If you have a Risc PC then *Elite* will run, but it will be faster than normal. *GameOn!* from The ARM Club sorts this problem out, as well as fixing loads of older games to work on the Risc PC: you can contact them on 0171-624 9918.

Playing Elite

Elite is set far in the future, when eight galaxies have been colonised by the Galactic Co-operative. You have just passed your space pilot's exams, and when you start the game you are sitting in your ship – a Cobra Mk III – in a space station, orbiting the planet Lave.

In *Elite* you can fly your ship around, firing at anything you see, and jumping through hyperspace between planets in the galaxy. As all this costs money for fuel and so on, you need to make money by trading goods between planets: each planet has a different stock market price, so you can make a tidy profit – or loss – by trading commodities. As you earn more money, you can buy more equipment for your ship – such as better combat lasers, fuel scoops and so on – and so improve your effectiveness in combat.

At the end of the day, the object of *Elite* is to destroy so many enemy ships that your rating goes up to *Elite*. Initially you are given the rating *Harmless*, and as you destroy more and more ships, asteroids and so on you progress through *Mostly Harmless*, *Poor*, *Average*, *Above Average*, *Competent*, *Dangerous*, *Deadly* and finally *Elite*. Don't be fooled: to get to *Elite* rating requires months of dedicated play, but there's so much to see and do on the way the journey is worth it.

Flying your Cobra

When you first load the game and click on the *Elite* icon, you are presented with a swirling mass of stars – click once with Select to enter the game proper. You can now see your status displayed: this shows where you are and where your hyperspace is locked onto (Lave), the fact that you are docked, your fuel (seven Light Years), how much money you have (100 credits), your legal status (Clean) and your Combat Rating (Harmless). As you progress through the game these values will all change, as will the equipment listed at the bottom of the screen.

At any time in the game you can return to the Desktop by pressing F12 or clicking on the DESK icon – try it now. To return to the game just click on the *Elite* icon and you'll be back where you were before pressing F12.

First, let's try some flying. This takes some serious getting used to, so don't expect to be competent for some time. Before doing anything, make sure your Caps Lock light is lit on the keyboard – if it isn't, press Caps Lock). This switches on 'damping mode' (don't worry what that means) and makes flying much easier.

To leave the space station, press F1 (or click on LAUNCH). You will fly through a tunnel, and come out into space: *don't panic!* Start by pressing the middle mouse button until your speed – shown by the SP indicator on the top-right of your controls panel – is zero. Now, you're hardly going anywhere, so you can't crash.

Take a look round your controls, as detailed in Figure 1. One of the most important navigational controls is the Compass, located next to the speed indicator. This shows the position of the space station (if you are within the space station's safety area, shown by the S at the bottom of your control panel) or the planet (if there is no S). If the dot in the compass is white, then the station is in front of you, and if it is red it's behind you.

The position of the dot within the compass shows if it is to the right, left or whatever. Try rotating your ship so the dot is white and in the middle of the compass: you should see a Coriolis space station right in front of you, silently spinning against a backdrop of stars. Now try rotating yourself so the dot is in the middle, but is red, and then press F2 to look out of the back of your ship. There's the station again.

Now press F1 to go back to forward view, and experiment with moving around. The right mouse button speeds you up, and the middle one slows you down. This is a good time to experiment with your 3D scanner. If you crash into the planet (you'll know if you're getting closer because the AL reading will go down) or the space station, you'll die, but don't worry, there's plenty of time for practice. By the way, the left mouse button fires your laser: try it out, but if you fire on the space station, it will send out loads of police to get you...

What next?

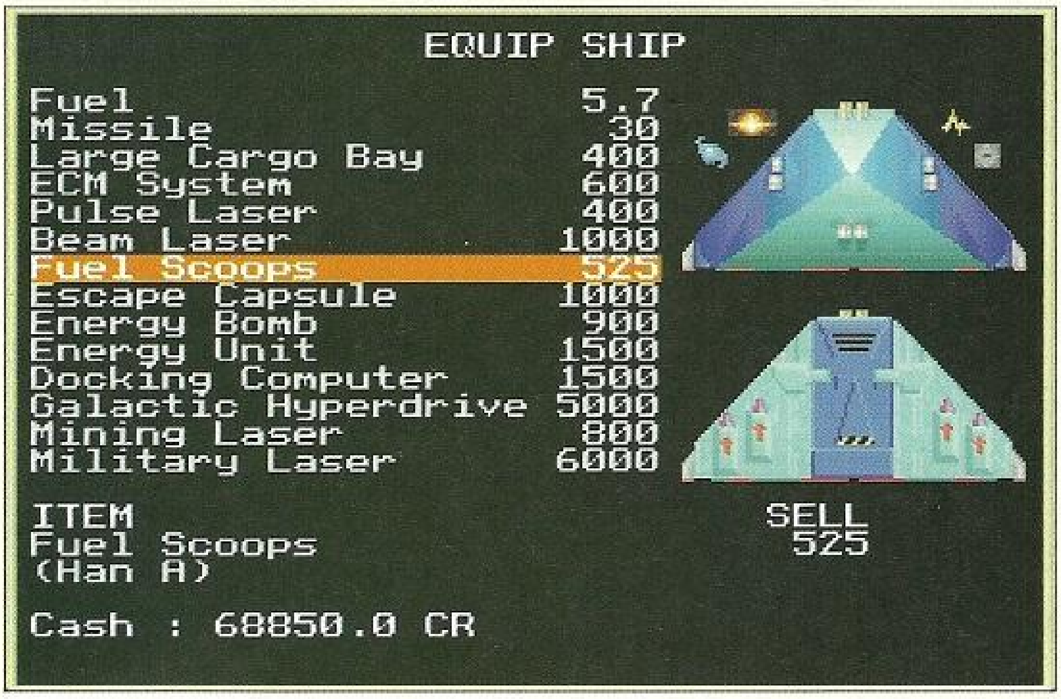
Trading is covered in detail in the file *7Trading*, and flying between planets by hyperspace is covered in *3CobraIII*. You can only buy and sell when you are docked, and you don't know prices until you have arrived at a planet, so you're not guaranteed a profit until you've actually done the trip.

If you want to get into the game more quickly, without doing too much trading, then the commander file *Gisburne* has more credits and a high combat rating. To load this, just double-click on it in the Desktop, and then click on the *Elite* icon as usual.

When you've tried a bit of flying, and maybe a bit of hyperspacing, do read the manual through. It contains a lot of little clues which are invaluable later on in the game when you are set missions to prove your worth. Next month we'll let you into a number of secrets about the game, but in the meantime, happy shooting!

Keys used in the game

WHEN DOCKED	
F1	Launch into space
F3	Trade
F4	Buy equipment
F5	Galactic chart
F6	Local chart
F7	Data on system
F8	Status display
F9	Hold contents
F10	Trade prices
F12	Return to Desktop
WHEN FLYING	
F1	Front view
F2	Rear view
F3	Left view
F4	Right view
Esc	Launch
J	Jump space
H	Hyperspace
C	Turn docking computers on (when fitted)
D	Turn docking computers off (when fitted)
Ctrl-H	Galactic hyperspace (when fitted)
T	Target missile
U	Un-target missile
M	Fire missile
E	ECM (when fitted)
Tab	Launch energy bomb (when fitted)
Delete	Jettison cargo canister
Caps Lock	Toggle dampers



```
                 EQUIP SHIP
Fuel                          5.7
Missile                        30
Large Cargo Bay               400
ECM System                    600
Pulse Laser                   400
Beam Laser                   1000
Fuel Scoops                   525
Escape Capsule               1000
Energy Bomb                   900
Energy Unit                  1500
Docking Computer             1500
Galactic Hyperdrive          5000
Mining Laser                  800
Military Laser               6000

ITEM                                 SELL
Fuel Scoops                           525
(Han A)

Cash  :  68850.0 CR
```

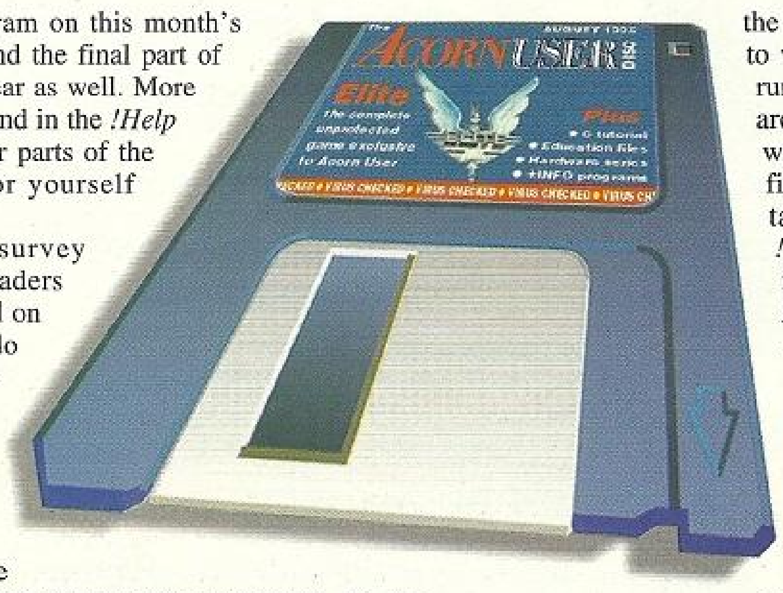
A well-equipped ship is an essential in any combat situation. Buy with the Adjust mouse button, sell with Menu.

Disc information

ELITE is not the only program on this month's disc – our regular features and the final part of the Internet Starter Pack appear as well. More details about these can be found in the *!Help* files on the disc, and in other parts of the magazine such as the C for yourself article and ✱INFO.

The majority of our survey responses suggested that readers wanted more software packed on the cover disc. In order to do this, we have removed the *Menu* program.

RISC OS 3 users will be presented with the usual display of icons; they can open the archives by double-clicking upon them (this is the equivalent of the 'View' option in the *Menu* program). To get help on an archive, RISC OS 3 users should choose Help from the App. 'Appname' submenu obtained by clicking with Menu over the archive icon. RISC OS 2 users will have to work slightly harder. They should first run *ArcFS* to uncompresses the data in the archives. Double-clicking on an archive will open it, revealing a *!Help* file, a *!Run* file, a *!Sprites* file and a directory containing the archived data. Loading the *!Help* file into a text editor will give information on the archive contents. *Elite* will run on RISC OS 2, as will many of the programs in the ✱INFO section.

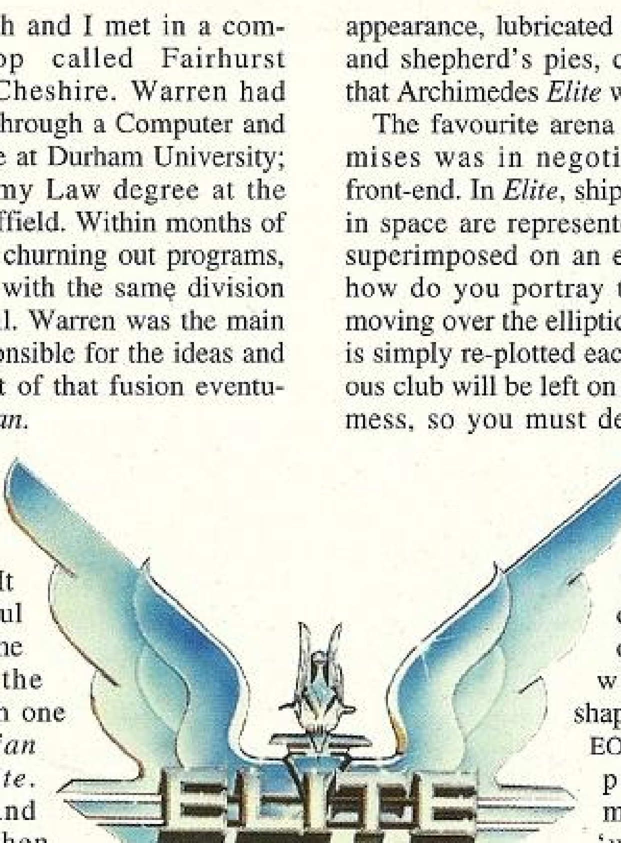

The ACORN USER
AUGUST 1995
Elite
the complete unprotected game exclusive to Acorn User
Plus
• C tutorial
• Education files
• Hardware series
• ✱INFO programs
VIRUS CHECKED • VIRUS CHECKED • VIRUS CHECKED • VIRUS CHECKED

If your disc is faulty, then you should either return it to TIB, TIB House, 11 Edward Street, Bradford, Yorkshire BD4 7BH (if it does not verify or is damaged) or to the editorial office at *Acorn User* (if it verifies). The *Acorn User* cover disc has been checked for viruses using *Killer* version 2.002 from Pineapple Software.

I wrote that . . .

Four years ago, two BBC Elite Commanders were allowed to flesh-out a dream: to write Elite for the Archimedes. One of them, Clive Gringras, tells all.

Warren Burch and I met in a computer shop called Fairhurst Instruments in Cheshire. Warren had recently breezed through a Computer and Electronics degree at Durham University; I'd just started my Law degree at the University of Sheffield. Within months of meeting we were churning out programs, each constructed with the same division of energy and skill. Warren was the main coder; I was responsible for the ideas and graphics. And out of that fusion eventually came ... *Trojan*.



Trojan was a three-dimensional space game with combat and missions. It was fast, colourful and championed the true power of the Archimedes, with one problem; *Trojan* simply was *Elite*. While Warren and his friend Stephen Pollard brainstormed amendments to prevent the game infringing the copyright in *Elite*, I mused on more legal solutions. I can recall the sound of Warren's jaw hitting the keyboard when I told him of my simple solution: we should write *Elite* for the Archimedes. After much negotiation with the authors of the BBC version, Ian Bell and David Braben, we were finally given the go-ahead. In May 1991, the twenty-hour days commenced.

Speed or style?

As mentioned earlier, Warren and I had different approaches to the same challenge. Warren would break down a task into logical portions, and then write the quickest, most efficient code to solve the problem. I was the dialectic opposite. Looks and feel were my main concern. This tension between efficiency and appearance, lubricated with black coffees and shepherd's pies, created the quality that Archimedes *Elite* was heralded for.

The favourite arena for these compromises was in negotiations about the front-end. In *Elite*, ships and other objects in space are represented by 'golf-clubs' superimposed on an elliptical grid, but how do you portray the 'golf-club' as moving over the elliptical grid? If the club is simply re-plotted each frame, the previous club will be left on the grid, creating a mess, so you must delete the previous club first; there are two main ways to delete this old club.

The quick procedure is to plot over the old club with the same shaped club, but in an EOR colour. For our purposes, this means that the grid 'underneath' the club is left unaffected and the club disappears. Unfortunately if two clubs cross one another, the crossed area vanishes.

The slower method to delete the clubs is by brute force. Simply 'blit' out all the clubs, 're-blit' the scanner and then draw in the new, moved, clubs. The testing we did on this suggested that it was at least five times slower than using the EOR method. However, when we saw the results of this slower method we were both convinced it was worth it.

The above quandary was not even in the same league as the irritation caused by the golden console itself. Although we knew that the scanner and readouts had to conform to the BBC *Elite* layout, we also knew that we should take advantage of the increased resolution and palette of the Archimedes. I designed about nine different consoles in *Atelier* – each as artificial as the last. By the time the sprite was compressed into the game, either I would have decided it was awful, or Warren would hate it.

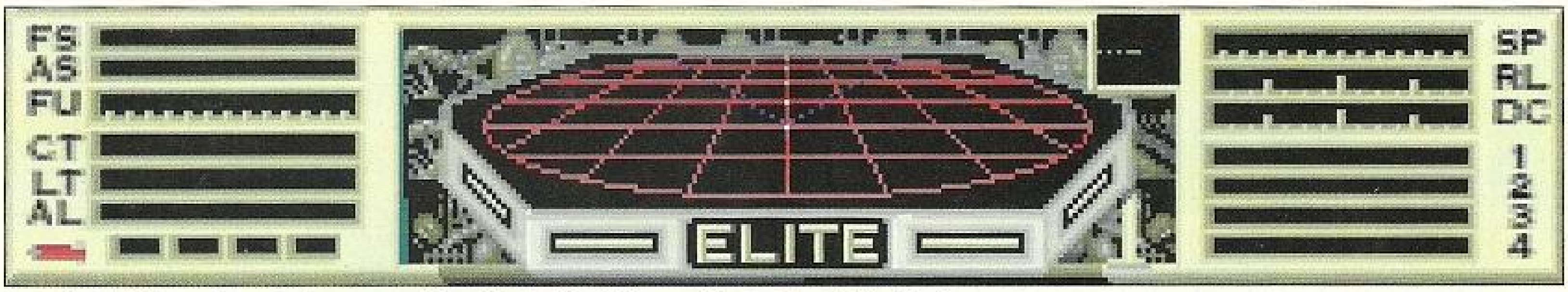
We finally achieved this sought-after depth by chiselling out the centre of the console. This allowed ships and objects to fly slightly nearer without being 'clipped' by the top of the console. Again, it caused a slight speed loss because we couldn't simply blit the whole playing screen as a rectangle, but we were finally happy with the console.

For this reason the triangle-plotting routine had to be frighteningly fast. It was the time-critical aspect of the Archimedes *Elite*. Eighty two percent of game time is spent plotting triangles. Even with Warren's incredibly optimised triangle routine, it remained quicker to recalculate the position of 50 ships than to plot one small fragment of shrapnel. This was why the triangle routine was written in pure Assembler – it had to be rapid.

Of course, not all of Archimedes *Elite* needed to be written in Assembler, due to the 80-20 rule; 80 per cent of the computer's time is spent in 20 per cent of the code. There is no speed gain in using Assembler to plot, for example, trading information; C is very capable and the user will never know the difference. Believe us, apart from taking a further six months to program and debug, a 100 per cent ARM *Elite* would not have been perceptively quicker.

Ships that pass in the night

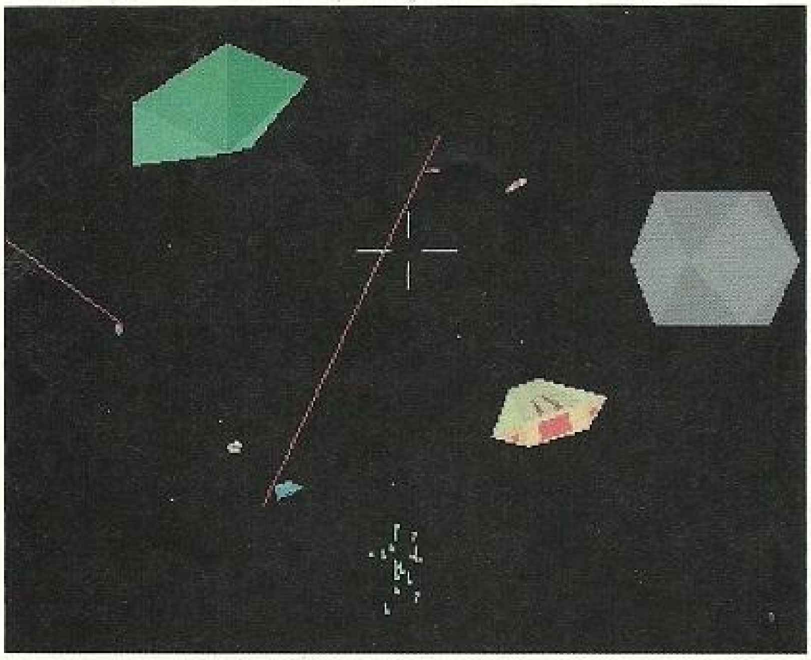
It is probably important to correct another rumour about Archimedes *Elite*. We didn't merely use the code from BBC *Elite*, tweak it and then add some colour to ships. The game had to be rewritten for two reasons. First, the code used in the original BBC version was very tight 6502 assembler, a far cry from C and ARM on the Archimedes. The second reason was self-imposed: we wanted to stretch the



A number of alternative panels were considered, including this one with an 'organic' feel to it.

Archimedes to the limits those two Cambridge undergraduates stretched their BBC to in 1984. It would have been too easy to rewrite a game written for a 32K BBC for a 1024K Archimedes without altering the specification. However, we were of the opinion that Archimedes *Elite* needed more ships, more interaction and more realism.

The creation of more ships was achieved, primarily, with the use of Silicon Vision's *SolidCAD*, the most professional 3D modelling program in the Archimedes' market. Sculpting a 3D spaceship out of thin air is never easy; one must work in three separate views and attempt to keep in mind a representation of what the craft should look like on completion. With some kind reprogramming of the modeller thanks to Yunas Nadiadi, we were able to effortlessly port these 3D creations straight into our game. All the three-dimensional shapes that appear in *Elite*, everything from the huge Generation Ships and Space Stations to the tiny Escape Capsules and Caimen, were crafted with *SolidCAD*. We got so carried away with creating new ships, we almost ran out of snake names!



Warren and Clive's original *Trojan* game, looking remarkably familiar. A number of things changed between *Trojan* and *Elite*; in *Trojan* you could fly straight through solid objects, engage reverse gear and even blow up the space station. Shame you couldn't do this in *Elite*!

One feature we would have liked to have included in Archimedes *Elite* was point-of-light shading. The reason this wasn't included was not laziness or inability; the Archimedes' palette simply isn't large enough. Either we used 64 colours with, therefore, only four ranges of shade, or 16 colours with 16 shades. Both options looked shabby and less realistic than block colours, and we found dithering the colours looked messy.

This all being said, even choosing block colours isn't easy. One particular choice of colours almost started an argument. I had designed a new-look Boa called, in true *Elite* tradition, the Boa II – sleek, fast and *pink*. But Warren objected to this colour. So strong was his aversion to pink that on one occasion Warren tried to compile the code without the ship. We finally came to a compromise that we would include on the Ship Datacards that the ship could be resprayed by Berch (as in Burch) Industries on Birera.

Interaction in action

Our philosophy behind Archimedes *Elite* was simple: the player should not be the centre of attention. To put this into practice, every object in space had its own mission. A ship's behaviour in space was out of our control as soon as the game's ship 'director' had selected them for inclusion in a particular

Thanks to...

Jez Swimer was an astonishing editor of the manual, especially as he didn't see the game until the manual was finished. For the actual layout of the manual, thanks go to Charles Moir at Computer Concepts for sticking in the Archimedes market and providing the fine DTP package, *Impression*. Appreciation must also go to the programmers of Acorn's *Draw*, which was used to generate all the manual's drawings, and to Rob Hamilton for providing an early version of *Merc_lib* for the Wimp Front-End. We must also thank Dr Lee Thompson who worked hard on an Elite tune that was sadly never included.

Help for the gameplay came from the able alpha-testing of Commander William Moffet, Commander Rob Woodgate, and Commander Bob Redrup; the Missionary ships were dedicated to Bob's close friend, the Mad Hatter. Laser physics and space flight were explained by Prav (soon to be Dr) Patel. Many of the mission concepts and cute 'touches' came from Mat Tizard who, in respect, had Zartid m.t.a. named after him.

Obvious thanks go to Chris and Tony at Hybrid and lastly to the first ever *Elite* Commanders – Ian Bell and David Braben – for writing the ultimate space game. Even ten years on there has been nothing to beat *Elite*.

scene. For the first time in *Elite*, ships fought each other. Sometimes we'd fly out to the sun and see 30 or 40 pirates at war, only to be stopped by a band of Police Vipers with their unique white lasers.

We also introduced ships flying in formation: Missionaries in herds; Mambas huddled in groups to protect wealthy pirates; Vipers in sixes and sevens. The temptation was to pick off one Viper with a shot up the glowing boosters – less effective than one on the body, as the laser bolt is refracted by the plume of the booster – and then watch the other Police gracefully break formation like ballet dancers. Unfortunately, this temptation wore off after we realised that five Vipers don't play fair after you kill one of their buddies.

Sorting the men from the boys

Our discussions with David Braben and Ian Bell sometimes ended with Ian or David saying a particular aspect of the game was quite tricky. Docking computers was a case in point; Ian said they should 'sort the men from the boys.' He was right.

The first hurdle with docking, as any Commander knows, is getting lined-up with the letterbox (opening slot) of the space station. This was achieved by marking a point out in front of the letterbox with an invisible buoy. However, lining-up with the letterbox is the least of a Commander's worries; it's the 'boxing' or matching the rotation of the letterbox that really flummoxes.

We decided to imagine that there was one 'arrow' or vector sticking out of the right wing of the ship and one out of the left side of the space station. As the station rotated, the two vectors described the various positions of the hands of a clock. When the vectors pointed in the same direction, it was safe to dock without scraping the craft. Therefore we coded the flight program to minimise at all times the angle between the two vectors. Because the flight program actually manipulated the Cobra, the added bonus was that – if present – yaw boosters were utilised, and the player could still use the Cobra in case of trouble. Needless to say, the next communication from Commander Bell began, 'Hello *men*...'!

The programming of missiles was also demanding. If the missile flies too quickly it's no fun to watch and it's even less fun to avoid. If it flies too slowly it can be outrun. But that is only the half of it. If its maximum turn angle is too obtuse, it can end up overturning and circling a target in simple harmonic motion like a fly. And if it can't turn enough, it can overshoot and never come back. So how did we solve this complex mathematical riddle? With the use of complicated vector algorithms? Intricate formulae? Well, not quite. We used that tried and tested scientific principle of trial and error! By the time our missiles didn't overshoot and weren't too accurate we'd shot over a thousand of the blighters.

Before we're asked, yes, we did use a special Commander with infinite missiles. And, no, we won't be releasing that file.

Some things never change

There are two specifications that should never be changed for any version of *Elite*. We wanted to ensure that in Archimedes *Elite* the planets in the Galaxies and the trading prices on those planets adhered rigidly to those in BBC *Elite*. To do this we needed the actual code used by Ian and David. But it wasn't as simple as that. The unseen difficulty was that the code that generated all this information was quite machine-specific, because the algorithms used were tied in with the workings of the BBC. Because we couldn't face having our galaxies different from those in the original *Elite* we took no chances; Warren wrote a small 6502 emulator to run that section of code. AU

Where are they now?

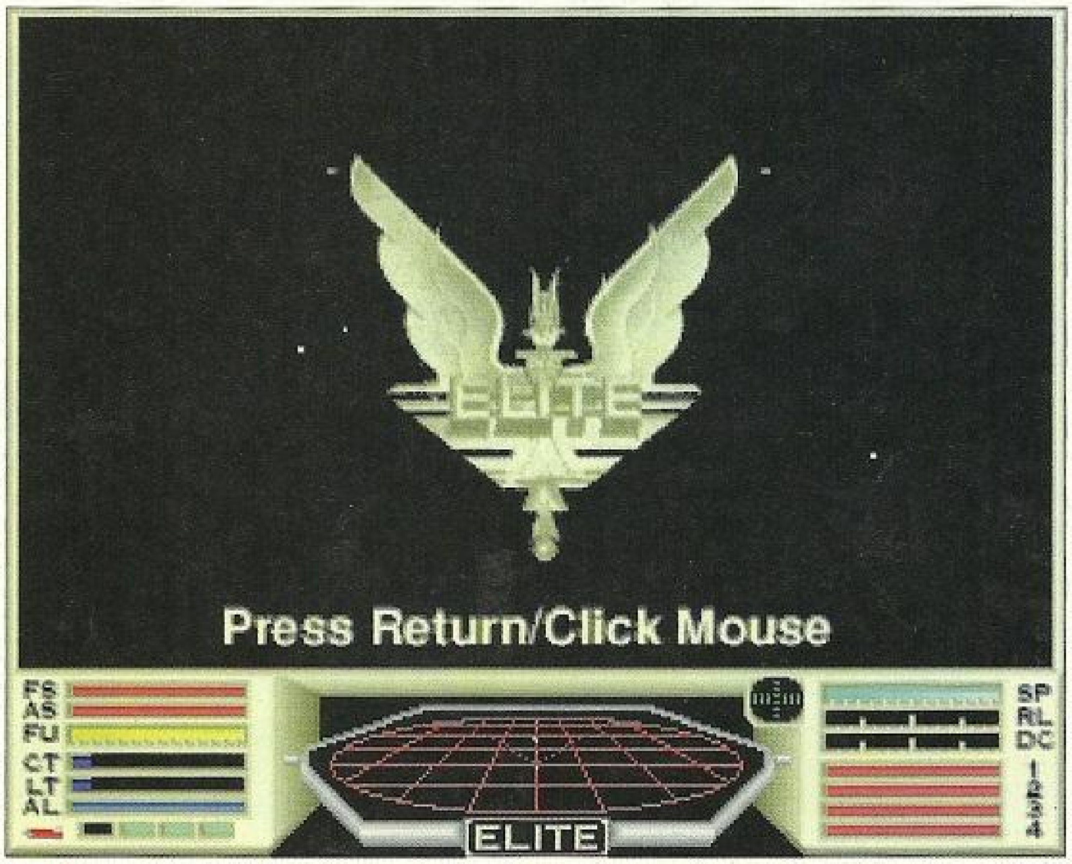
For one reason and another, both Warren and Clive said goodbye to programming the Archimedes after finishing *Elite*.

Warren now lives with his wife and daughter in Seattle and works as one of the coders for Microsoft. He's been out there for almost four years now and loves it; he skis, flies a plane, rides his motorbike, hikes up Mount Rainier and still programs into the night.

Clive has just joined one of the largest law firms in London, called Nabarro Nathanson. They sponsored him through Law Finals and a year as a Law Postgraduate at St John's College, Oxford where he concentrated on the licensing of software. He hopes, eventually, to specialise in Computer Law.

So, as you can see, they're both still very involved with computers, albeit 8000 miles apart. Still, that's nothing in their Cobra Mk IV...

David Matthewman



Another idea which didn't make it to the final game – a pretty 3D *Elite* logo on the start-up screen.